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LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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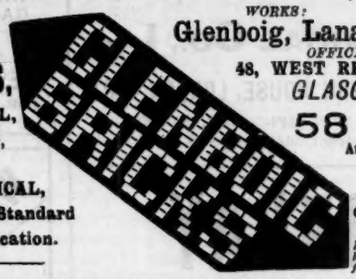

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CLIII., No. 3014.] WEDNESDAY, FEBRUARY 16, 1921. [73RD YEAR.

EDITORIAL NOTES.

Carbon Monoxide Hypothesis and Actuality.

THE carbon monoxide inquiry has started; and we publish to-day a long report of the proceedings at the first of the sittings of the Committee appointed by the Board of Trade, which proceedings are being conducted under the chairmanship of Sir William Pearce. From the day of the sitting, about a fortnight will pass before the Committee will again meet; but meantime the Committee on incombustibles will begin their investigation, so that we shall get the two inquiries running (so to speak) in parallel, and probably have the conclusions of the Committees about the same time. We do not know what lines the Carbon Monoxide Committee are taking in arranging for evidence. But it seems to us that those who preferred the claim for limitation of carbon monoxide in gas supplied for domestic purposes should have been heard first; and the gas industry's case in opposition to restriction should have succeeded. Instead of this, Dr. Haldane is the only scientist who has so far been heard; and then witnesses from the National Gas Council followed. It can hardly be said that Dr. Haldane made a claim for restriction, beyond expressing his old-time conviction that a 20 p.ct. limitation would be a proper thing. Admittedly, he has some fairly positive views on the subject, largely derived—mark this!—from experiments conducted by him in a room without any ventilation, and the walls of which are not porous. Dr. Haldane deals with physiological effects under unusual circumstances; and he treats of risks as calculated by the chemist and physicist, but presents no definite and modern statistics to show that the risks are confirmed by actuality in our year-by-year experience of gas supply. Progress in many walks of daily life is accompanied by increased risk. There is greater risk in express trains than in slow ones; there is greater risk in mechanical road traffic than in horse traffic; there is greater risk as voltages ascend in electricity transmission. But it does not follow that the accentuated risk finds proportionate expression in actuality when measured by the increasing use of railways, roads, or electrical energy. However, the scientist has his own point of view; and it is not always the most practical one. Fortunately, the members of the Committee are quite capable of examining the question from both sides.

The terms of reference to the Committee entrust to them the duty of answering whether it is "necessary or desirable" to prescribe any limitation in the proportion of carbon monoxide supplied in gas for domestic purposes. To some men who regard only the insufficient consideration of the toxic effects of carbon monoxide, it may seem to be "necessary," but looked at from all aspects it may be very undesirable. The Committee, however, have to examine the weight of every point of economy, the advance in the applications of gas, and experience as opposed to theoretical risk, before they will be able to say whether or not it is desirable to apply a limitation. The risk is magnified and accentuated by the scientists who, like Dr. Haldane, favour a 20 p.ct. limitation, and at once would create a barrier to progress in the utilization of our coal, to economy in transport, to the subterranean supply of a labour-saving fuel, to the cheapening of that fuel, and to invention, and all for the sake of something that looks much like a fad when subjected to scrutiny in the light of statistics. To refer to American statistics of nearly a quarter of a century ago shows a poverty of evidence; to insinuate that the conditions of supply and application between then in America and now in the United Kingdom have anything in common would be an indication of scant knowledge of the subject. We have progressed in this country in the gas equipment of our dwelling-houses and other buildings. Gas-fitters have greater competence; supervision has grown; and more is done now than in the old days on the gas consumers' premises. And among the poorer sections of the community, the prepayment installations are the property of the gas suppliers, and are maintained by them. The old water-slide chandelier has gone out of use; appliances are more efficient; and no gas undertaking will fit geysers without flues. We should not at all regret to see the installation by outside fitters of geysers without flues made illegal, nor should we at all object to see a greater measure of control over the fitting-up of houses (as advocated by Dr. Haldane) put into the hands of gas undertakings. As for the small rooms of which he speaks, what we have already pointed out as to prepayment installations being the property of gas suppliers is the answer to that suggestion. As to suicide, Dr. Haldane told one of the members of the Committee (Mr. W. Doig Gibb) that he did not think convenient means of taking one's life should be "left about." They are "left about" everywhere; and the choice is great.

The number of deaths from gas poisoning in 1897, and the number in the last return of the Registrar-General is not evidence as to the supposed great risk having materialized into actuality without taking into account the increased number of persons using gas and the considerable enlargement of consumption. As the President of the Institution of Gas Engineers (Mr. Thomas Goulden) mentioned, there have been very high percentages of water gas distributed during the war years; and the statistics he gave—for ten years, be it noted—of the gas fatalities in the dense area of the Gas Light and Coke Company (29) are a rebuff to those who want to forge fresh shackles for the industry. In the Liverpool area of supply, the statistics furnished by Mr. R. E. Gibson show that since 1899—twenty-two years!—there have been 16 suicides and 38 accidental deaths; and 22 of the 38 were in districts in which the gas contained less than 12 p.ct. of carbon monoxide, and 16 in districts in which the gas contained over 12 p.ct. The smaller number was in the area in which the greater percentage of carbon monoxide is found. And Mr. T. F. E. Rhead, the Chief Chemist of the Birmingham Corporation Gas Department, has been through the coroner's records for the city, and finds that in the past twenty years the number of fatal accidents due to gas poisoning is six. There is something actual in the figures of these three witnesses; and alongside them the hypothesis as to risk sinks into insignificance. Without speculating as to the decision of the Committee, if we were asked as to the logical conclusion to be drawn from such records, it is that the safety of gas supply is beyond reproach, when contrasted with the fatal accidents caused by other public services. It seems pretty clear that in this matter there are men of high scientific attainments who are unprofitably spending time in chasing an *ignis fatuus*.

There are the economical aspects of water-gas manufacture. These again the Committee cannot overlook in deliberating over the question of the desirability of limitation. It was a point that was particularly emphasized by Mr. Goulden. National interests urge the saving of coal. At the present time the production of water gas represents a saving in coal of 6,400,000 tons per annum. But there is a feature of this that requires a little expansion, because it shows the necessity of the investigation being driven to the utmost limits in order to gain a full appreciation of the facts. The point was put to Mr. Goulden that if the coke from a ton of coal is used for the production of water gas, there is that much fuel removed from the market which

has to be replaced by coal. This would only apply if it were the whole of the story when fuel is scarce. It does not apply now; and it did not apply before the war. The half ton or so of coke has (let us put it) a calorific value of 14,000,000 B.Th.U.; but for domestic purposes it would only be used with about a 20 p.ct. efficiency, which means 2,800,000 B.Th.U. usefully applied. The coke will produce 23,000 c.ft. of water gas, which lightly carburetted will give 12,000,000 B.Th.U. For gas-fire use an efficiency of 75 p.ct. can be obtained, which means 9,000,000 B.Th.U. usefully applied, or for ordinary boiling purposes (with gas-geysers and other means of heating a higher efficiency can be secured), the efficiency will be, let us say, 50 p.ct., which means 6,000,000 B.Th.U. Thus in addition to labour-saving, there is more heat usefully applied the gas way than in the coke or coal way. This is highly important in considering the question of the conservation of coal. On this point the Committee might take into account the matters raised and recommendations made in the report of Lord Newton's Committee on Smoke Abatement and Noxious Vapours. Then further there is the capital and space economies of water gas and complete gasification systems, together with the saving of labour. And above all the industry does not want to lose the opportunity of developing with that freedom which is of the very spirit of the report of the Board of Fuel Research. The interests of the industry are so large that it can be safely left to develop its service without doing anything that will at all prejudice those interests.

The Beginning of Reconstruction Results.

IT is clear that Dr. Carpenter and his colleagues of the Board of the South Metropolitan Gas Company are well satisfied with the progress so far achieved by them in dealing with the problems of reconstruction; and they have good cause for being so, though the uncertainty that clouds the future of everything—raw materials and bye-products especially—renders it utterly impossible to speak with any measure of confidence as to what will even probably happen. The programme of reconstructive policy has been developing for some time in the Company. The war enlarged it in respect of financial, working, and gas-trading methods. The Company's Act of last year was the consequence. The Bill which has been introduced for the coming session, to amend the capital powers and for other purposes, is another result. These measures contribute to internal power and settlement, and the placing of the financial conditions on a sound basis. It is all to the good; and, through what has been done and is being done, the Company will be better able to withstand the adversities that may still arise from external causes, and take better advantage of all favourable circumstances. It is undeniable that there is something very definite about the policy of the Company in these days; and this is a good thing, particularly when the policy is one that does not curtail but promotes freedom. As the proprietors, at their annual meeting last Wednesday, heard from the Chairman as to what had been done and as to the present position, they unanimously endorsed the acts of the Board; and even the picture of a future that is impenetrable in existing circumstances did not dismay them. A lowered confidence among the stockholders has been rarely openly expressed, even if secretly entertained; but it is palpable that, if events had a bad effect during the war, the restoration of confidence has set in with marked strength.

There is a word of warning from the Chairman to the stockholders which may be circulated among gas share and stock holders generally. The Company have abandoned the sliding-scale; they have a minimum dividend of 5 p.ct. on the existing ordinary capital, and 6 p.ct. on any new ordinary capital that may be issued. But beyond this they have the novel system (in the devising of which no doubt the Chairman was chiefly responsible) whereby the consumers, the proprietors, and the employee partners all share in surplus profits when the price is below the basic figure per therm. The price is under it now by one half-penny per therm; and the Company have the power to apply the profit-division scheme to any period of a year during which a reduced price for gas has been in operation. But there is no extra profit for division on this occasion. A 5 p.ct. dividend is being paid, and for this the stockholders are obviously thankful, after the niggardly return allowed temporarily by an unappreciative Parliament. It is to the beyond 5 p.ct. (which is assured) that the warning applies, and would equally apply to concerns that will come under the Gas Regulation Act. "Now it is very important," Dr. Carpenter remarked, "that you should not imagine that "this is going to take place forthwith." In other words, stock and share holders must not expect miracles. Benefits and happier conditions cannot mature swiftly or immediately on the passing of an Act; and this remark will apply the same to the Orders issued under the Gas Regulation Act as to the South Metropolitan Act. Though there is this to be said, that the South Metropolitan proprietors at once enter upon the enjoyment of their minimum dividend. But for the larger advantage, the process of evolution has to come into operation; and the pace of operation will depend not upon the will, acumen, and energy within the Company, but upon the degree of effective repression exerted by various outside forces.

The extreme uncertainty of the future in respect of coal and secondary products was alluded to by the Chairman; but he said nothing as to the uncertainty of labour, because the South Metropolitan employees know of the interdependence of capital and labour, and that the one is so necessary to the other that they are not detachable. Where division exists between them, then it is of artificial creation. However, the uncertainties as to both coal and bye-products led Dr. Carpenter to remark that the Company must proceed warily with their primary product to-day, as nothing avoidable must be allowed to injure the gas business, which is in a very healthy condition. There was no indication on the Chairman's part that the present price of 10½d. per therm is likely to ascend; but no pledge can be given that it will not do so. This Dr. Carpenter admits when he mentions that circumstances may even compel the Company to seek a still higher basic price; but he hopes not. It is quite plain that there is going to be a struggle to retain (if it cannot move downwards) the initial 10½d. per therm, unless adverse conditions prove too strong. That is the resolution; and it is confirmed by the statement that it is the intention of the Directors "to keep down the price of gas to "something like its present figure, and not to alarm the con-"sumer, or to risk permanently damaging our relations with "him by even temporarily raising our price to get over "near-future difficulties, so long as we can possibly avoid "it." Summed up, there must in these times be patience on the part of the stockholders, and prudence on the part of the Directors.

The Chairman made a statement as to why the Board decided not to take part in joint action last parliamentary session to secure better financial terms. The failure of joint action in 1917 to accomplish this was one reason. Another was that the feeling had been gaining strength among the Directors that the remuneration of gas capital had been outdistanced by the altered circumstances of its investment, and the changed conditions under which it had to compete for business. Hence the desire of the Directors to do away with the sliding-scale, which had proved so frail in the hour of greatest need, and to institute a new system. The latter was a good reason for independent procedure; the failure of joint action in 1917 was not, as the Gas Regulation Act has proved. "I would draw your special "attention to the fact that the Gas Regulation Act passed "at the instance of the Board of Trade was expressly "framed with the object of reconstituting the pre-war posi-"tion, and nothing further." This statement requires modification by the inclusion of the word "dividend" before "position," the conversion of the word "expressly" to "partially," and the deletion of the words "and nothing "further." For the Gas Regulation Act goes much farther than that single object, as all gas men well know, but all gas stockholders may not. When comparison is talked about and made, it may be asked, Was the South Metropolitan Bill successful in achieving the desire for a better remuneration for invested capital? The value of a minimum dividend is admitted; and we have always favoured the Company's new plan for dealing with the additional profits. But if the Gas Regulation Act was expressly framed for reconstituting the pre-war dividend position, the South Metropolitan Act (whatever the Bill may have proposed) allows the stockholders a 5 p.ct. dividend, whereas they were receiving more than that before the war under the abandoned sliding-scale. Therefore, so far the Company's Act has not "reconstituted" the pre-war position in this one respect. What is more, there is nothing in the Company's Act that cannot be obtained by Special Order under section 10 of the Gas Regulation Act.

Welcome was given by Dr. Carpenter to the decontrol

of coal, because he believes it will enable buyers to exercise greater influence over quality and cleanliness. He strongly objects to control over sulphate of ammonia exports, but advocates (if we understand him correctly) the prohibition of the export of our best coking coal, so that it may be converted into bye-products here, instead of abroad. And he also agrees with the control of the importation of dyes, and hopes that protection will be given to the British glass industry. With very much that the Chairman said in this connection we agree; and as to the sulphate of ammonia export position, this is likely to be only a temporary and not a permanent matter. Taken as a whole, no speech Dr. Carpenter has delivered from the chair of the Company has contained more interest. The work of reconstruction has begun to yield its results.

The Act as Viewed by the Secretary.

IT was on Aug. 4 last year that the Gas Regulation Act received the Royal Assent. That is six months ago; and up to the present an Order has not been issued under the Act, though one is expected shortly. The point is made not by way of complaint or criticism, but because it is patent to all who have kept close watch upon the movements associated with the new legislation that the delay has been of advantage. The Board of Trade did quite the correct thing in getting their machinery assembled and in ready working condition instead of prematurely issuing Orders before the machinery was in position for operation. The delay had still another advantage. While the Bill was in embryo, and during its progress through Parliament, many men in the industry fashioned in their minds all sorts of difficulties that the reconstructive measure would introduce, and so to a large extent detract from its benefits. The time that has elapsed has enabled closer intimacy to be formed with the provisions of the measure; and as investigation and discussion have proceeded, the men of the industry have been better able to visualize what the new order of things holds in store. The solid worth of the Act has thus gradually assumed more definite shape, and so has been brought into clearer view. The difficulties that at one time seemed formidable in the imaginations of some have dwindled into shadows, and will ultimately disappear altogether. We gather that with these views Mr. T. P. Ridley, the Secretary of the Newcastle-upon-Tyne and Gateshead Gas Company, is in complete agreement. He is the writer of this week's contribution to our special series of articles relating to the gas industry on the heat-unit basis. Mr. Ridley has taken a very live interest in the Act from its birth down to the present time. He will continue to do so; for the clearance it makes of legislative difficulties and precedents, and the opportunities it gives to the industry, are to him actualities, and not shams. Under its powers he can see the industry ascending to a higher level of working, to the advantage of proprietors and consumers alike. Speaking generally, the industry has not had a good name in the past, though its primary commodity has been so much in demand; and this was due more to the webwork of restriction and tradition that was about it than to any real *mala fides* on the part of those to whom administration and management were entrusted. That webwork is to be swept away by Orders that will place the working of gas undertakings under the provisions of the new Act.

Naturally, to the secretary of a gas company considering the benefits of the Act, the financial revision that it confers will be the most striking feature. But our contributor studies the whole of the main elements of the Act, to see their effect upon prosperity. In his official capacity, Mr. Ridley stands as the chief link between technical doings and the consumers' interests. He desires to save himself and his staff all unnecessary work; but he does not at all object to having the incidence of work shifted a bit, if, on balance, a good part of the unpleasant side of the work is eventually to be removed. There may be a little more work to do in making out accounts, and in getting (this is really only a temporary matter) statistics of the immediate past on to a basis with which comparison of the new heat-unit statistics can be readily made. But if the new heat-unit basis of working and trading is going to produce (as it must do) greater uniformity in calorific value and specific gravity and adequate pressures throughout a district, then there will be larger satisfaction on the part of consumers, and so fewer complaints with which to deal. If this is a result, and we see every reason why it should be, then the little additional work upon the consumers' accounts will be well paid for by the relief secured in other directions which the changed conditions bring about. Mr. Ridley also sees substantial advantage to gas undertakings in section 10 of the Act. The expense of obtaining enlarged powers through a Bill in Parliament, even though it may be unopposed, is often a burden of considerable weight. Now through Special Orders such powers will be procurable at no very great cost. Another benefit will be, with a Director of Gas Administration at the Board of Trade, that the industry will have brought to bear upon its legislative work an accumulated knowledge of its requirements, and not have decisions imposed upon it which are framed in greater part by precedent and in the smaller part by the application of the little knowledge of the subject that can be picked-up hurriedly by members of Committees, according to the degree of capacity.

So the Act is good, and there is really nothing alarming about it, from the secretarial and commercial points of view. Mr. Ridley makes various useful suggestions. One is as to the form of account which might be used in those places where meter-index cards are not kept upon the consumers' premises. This occurs in many towns in the North of England; and, being the custom, it is very rare indeed that a special request is made for a card. In those cases the state of the index and the consumption are shown on the accounts as rendered to the consumer. Our contributor gives an example of a form of account that could be used under the heat-unit basis; and he also supplies information as to the practice at Newcastle. The absence of a meter-index card may save the time of the index-reader; but it does not enable the consumer to check the entry made by the reader until the account comes in, and by that time the index pointers will have journeyed to new positions.

Another suggestion made by Mr. Ridley is of a very controversial kind. Pointing out that the price of gas varies in somewhat definite relation with the price of coal, he suggests that it would be worth consideration by the Board of Trade whether, in fixing a standard or maximum price, a scale should be also specified under which the standard or maximum price in the Order should automatically rise or fall by so much per therm for each xd. by which the cost of coal delivered into the works varied from that upon which the standard or maximum price had been based. He thinks this would be a useful addition to an Order, and quite consistent with the principles of the Act; while application for such a scale could be quite optional on the part of gas undertakings. In our opinion, there would have to be great care in applying this condition. There are in existence to-day contracts for bulk supplies of electricity, the prices of which vary with the cost of coal; but labour and other charges have grown so enormously that it is considered wise not to make contracts that do not provide for price movements on changes of labour (as well as of coal) or over-all costs. One can quite imagine the price of coal dropping somewhat, but labour and other expenses ascending; also that a heavy slump in secondary products might neutralize any advantage of a reduction in the price of coal. And, further, Mr. Ridley suggests that the basis of variation should be the cost of coal "delivered into the works." The cost of coal "delivered" might, however, be lowered by the spending of capital on means of conveyance from the pits or by coal-handling plant, which capital would require its interest or dividend. If such a scheme of an automatic rise or reduction of the standard or maximum prices were adopted, it would for many undertakings have to be on pit-head prices. But in view of the uncertainty of various other important items of expenditure, we incline to the opinion that most undertakings will fight shy of it, and will prefer, in the event of cost seriously changing, to apply to the Board of Trade for revision of the standard or maximum price per therm.

Among other points discussed by Mr. Ridley is the question of making application for borrowing powers under the Public Utility (Capital Issues) Act or under section 10 of the Gas Regulation Act; and he leans to the latter course. He also suggests that the Board of Trade should, in respect of applications under section 10 of the Act, amend the iniquitous restriction which the tar distillers have thrust upon gas undertakings in respect of the purchase of tar. We see no reason why the Board should not do so; but they will not voluntarily alter Acts of Parliament. The matter should be tested in an application for a Special Order, when cause could be shown for the removal of the restriction. These are suggestions; and suggestions of the kind are highly useful

to the industry in these days of transition—a transition to which large contribution is being made by this piece of legislative work, in which it is clear Mr. Ridley (like many far-seeing gas men) finds nothing but good for the industry and its customers.

Local Authorities and Standard Prices per Therm.

THERE appears to be much misconception abroad among local authorities respecting standard prices per therm that are being asked for by gas companies working under the sliding-scale. This point is the one on which is being based considerable local opposition, which is carried to the Board of Trade. Members of local authorities simply convert the proposed standard price per therm into the equivalent price per 1000 c.ft.; and they see that it is 100 or 120 p.ct., or whatever is the relation, more than the standard price per 1000 c.ft. was before the war. They do not make any due allowance for the increases there have been, and which will be more or less maintained, in the costs of production. If these costs were taken fully into account, the prices per therm asked for would not be so low as they are. The fact is also overlooked that if, after a period when matters reach a more stable basis, the local authorities have a case for a reduction in the standard price that is now allowed, they will have the right to apply to the Board of Trade for a revision of the figure; and if they have then a case superior to that of the supplying company, they will succeed in getting a reduction. But the chief mistake in their present attitude is that they confuse the standard price per therm with the actual price that will be charged. The standard price per therm to which a company is now statutorily entitled is a price that, under prevailing costs, and a fair assessment of their effects, will, at the actual price charged, provide a dividend which is about equal to that the proprietors were receiving prior to the war. There is nothing dishonest about that; it is a matter of justice. All this is well known to those officially associated with the gas industry; but there are readers of the "JOURNAL" who are among those who are opposing the applications for standard prices to-day. These remarks are particularly addressed to them. And this we want to impress upon them, that to obtain, under the sliding-scale, a dividend approximating that which was being received before the war, with the standard dividend at only 3 or 4 p.ct., it is clear there must be a sufficient margin in the standard price per therm to enable the difference between it and the actual price charged to allow of the payment of the additional dividend above the standard rate.

Parliament has recognized this right of gas companies to fair remuneration for their capital. They have given the right in the Gas Regulation Act; and to the Board of Trade has been entrusted the power to restore the conditions of gas supply to a position that will give to holders of capital their modest pre-war return—a return which, it might be submitted, is not fair under the altered value of money and the changed circumstances of competition, neither of which conditions was taken into the reckoning when the sliding-scale was instituted. There are, however, some members of local authorities who are either blind to what is equitable in the circumstances, or who would deliberately rob of their due the holders of capital in the gas industry. We see that, at the meeting of the London County Council last week, a resolution was put into the hands of the Public Control Committee, instructing them to take such action as is possible to "prevent" the Gas Light and Coke Company from charging a higher price for gas, and yet look forward (whatever the conditions of the coal, oil, and residuals markets) to an increased dividend. Did ever anybody see such a piece of gross stupidity? If this means anything at all, it is that, whatever the conditions of the coal, oil, and residuals markets (which conditions gas undertakings cannot help), if they necessitate a higher price for gas, the capital employed in the business is to be content with a 3 p.ct. or £2 12s. 6d. p.ct. dividend, less income-tax. It is obvious that, if current conditions will permit, the administrators of the Company will do their best to reduce the price of gas in the interests of the proprietors, who, with the existing price of gas (when the Board of Trade Order comes into operation), and under the sliding-scale, can only be paid a dividend of £4 13s. 4d. p.ct., if profits allow. It is a pity that our local authorities have among them so many men who cannot look at these questions from all points of view, and in proper proportion and perspective.

A good illustration of the misconception that prevails on this subject—misconception as to the difference between standard and actual prices, and the dividend restoration purpose of the former—was given by the Rt. Hon. Sir Daniel F. Goddard at the meeting last Friday of the Tottenham Light, Heat, and Power Company. The Company are applying for a standard price per therm of 1s. 7d., which is equal to 7s. 5d. per 1000 c.ft. But, of course, the Company have no intention of charging 1s. 7d. per therm. The greater part of their ordinary capital now only receives £2 12s. 6d. and the remainder £3 15s. per cent., less income-tax. The local authorities are opposing the 1s. 7d.; but the Company, in order to pull-up the ridiculous dividends now being paid to the stockholders to a point somewhat nearer the pre-war figures, will have at the outset to charge 1s. 2d. per therm. It comes to this, that it is not the standard price that the members of local authorities should consider, but the price that will have to be charged, in the present circumstances of higher expenditure, in order to restore to gas capital the pre-war rates of dividend, which no man with business capacity, or any notions as to what is equitable, can say were excessive even for pre-war days; and in post-war days these same dividends are exceedingly lean.

The Fourth Partner.

There is frequent speaking about the triple partnership in the gas industry, and overlooked is the position of the authority who are responsible for the levying of rates and the spending of the money gathered in. Just now they perform their rate levying and collecting with a very fine abandon. Sir Daniel Goddard, in his address to the proprietors of the Tottenham Light, Heat, and Power Company last Friday, called attention to this point, and to the fact that at the present time the rates are claiming more than is allowed to be paid in the shape of net dividends. He put the point into figures. At the last quarterly payment of rates, the Company were paying to the tune of £26,000 a year, while the net cash payments to the proprietors only came to £18,000 a year. In other words, those who invested the capital on which the undertaking and public service have been built-up are receiving less than the authorities are doing in the shape of rates. This is an interesting condition of things over which to ponder. The inequity of it is beyond dispute.

German Dyes and Home Production.

The Gas Light and Coke Company and the South Metropolitan Company are working to develop still more the chemical side of their business, so as to render all the aid they can (of course, they are looking for profit) to the British dye industry. There are good causes for everybody in a position to do so to work for the secure establishment of the industry in this country. Dr. Carpenter gave one in his speech at the South Metropolitan Company's meeting last week, as reported in this issue. Another is that, according to recently published information, Germany is now exceeding her pre-war production of coal-tar dyes; and by the end of the month, she will have surpassed any previous monthly production of fine chemicals. It is also reported that German dye products are being offered in foreign markets at prices considerably lower than those being quoted by British and American investors. That is the report; but we cannot vouch for its accuracy, though we see no reason to doubt it.

Education and Training of Gas Engineers.

Much has been said and written on the subject of educating and training gas engineers; and much of it has been good. It was an excellent contribution Mr. W. Bennett made at a recent meeting of the Scottish Junior Gas Association, as published in our issue last week. The specification which he lays down for the education and training of a gas engineer is a far-reaching one. It shows a very complete estimate of the requirements and responsibilities of a gas engineer. For our own part, we should not have the slightest wish to dissent from it in any way, if it were all practicable. Our position is among the advocates of the best possible competence and qualification. They are essentials of the highest importance—never more so than at the present time. But we do not want to limit the area of the ground from which technical gas officials are drawn, and so are afraid that the programme and the years that would have to be devoted to it by aspirants for technical positions in the industry would bring

about serious limitation by the inability of many men to afford either the money or time requisite for the courses laid down.

And of Administrators.

More men would be able to afford both, if the attractions to official position in the industry were generally better than they are. The really attractive places are in the minority. This has to be reversed in order to induce more young men of good intellectual capacity to seek to enter the gas profession. Mr. Bennett devotes one paragraph to the question of salaries. He thinks that when training and examination requirements are set high enough to weed-out the unfit, the level of the profession will be raised in the eyes of the public, and salaries will follow. Doubt arises in our mind. Where we think the real start in this matter should be made (if application were possible) is to prepare a specification for the education and training of gas administrators, and for compliance to be insisted upon by those having the authority. The education and training of gas engineers could be secured easily enough, if only all gas administrators were fully qualified to appreciate what is needed in their technical gas officials, and to pay them on a commensurate scale. Until that time comes, there may be much writing and much speaking as to what is required in the way of educating and training men for technical positions in the industry; but there will be no fullness of good effect.

Coal Output.

In the week ending Jan. 22, there was a further fall in the aggregate coal output. It was some 200,000 tons below the preceding week. The production was 4,691,600 tons, compared with 4,897,700 tons the week before. All districts shared the decline The same applies to the succeeding week—ending Jan. 29, when the output was 4,606,700 tons. This reduction is not a matter of collusion or arrangement of any kind; it is due to conditions. There have been, owing to the falling-off of demand, a good many men thrown idle. It is, however, hoped that this will be a condition of brief duration, and that demand will soon again bring about the relief which will enable the greater output to be made. According to Mr. Finlay A. Gibson, the amount of coal output lost, during the four weeks ending Jan. 29, through involuntary idleness, was 763,061 tons. During the week ending Jan. 29, 863 collieries were not producing, and others have since had to close-down in consequence of inability to dispose of their output.

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

A MEETING of the Central Executive Board of the National Gas Council was held at No. 30, Grosvenor Gardens, London, S.W., on Tuesday of last week. In the absence of the President of the Council, Mr. D. Milne Watson, the chair was taken by Alderman Phillips, of Salford.

GAS REGULATION ACT.

It was reported that no Orders had yet been issued under the Gas Regulation Act, but that the Gas Light and Coke Company expected within a few days to receive an Order giving them a new standard price of 1s. 3·2d. per therm, in place of the 3s. 2d. per 1000 c.ft., which was their pre-war standard. The 1s. 3·2d. per therm is approximately equal to 6s. per 1000 c.ft., which is thus nominally the new standard price. It was stated that the calorific value they propose to declare is 475 B.Th.U. The actual price per therm will now be 1s. 2d.—practically equivalent to 5s. 6d. per 1000 c.ft., and will allow of a dividend of £4 13s. 4d. p.ct. per annum.

OVER-DRIVING AND INCORRECT REGISTRATION OF METERS.

It was reported that draft clauses had been prepared by the Council's Parliamentary Agents, and submitted to the Institution of Gas Engineers, with a view to their insertion in Orders under section 10 of the Gas Regulation Act and Private Acts of Parliament, dealing with the overdriving and incorrect registration of meters, and high-pressure air-blasts. There were still some outstanding points which had not been settled in these clauses. The draft clauses would be published as soon as possible.

WAGON HIRE.

The efforts of the Council to obtain throughout the country a maximum charge of 1s. 6d. per ton in respect of journeys of 20 to 50 miles, instead of the maximum rate of 2s. per ton for distances of 20 to 75 miles, were reported. Considerable progress has been made in this direction; and in a large number of cases throughout the country a maximum charge of 1s. 6d. for 20 to 50 miles is in operation. The Council propose to continue their endeavours with regard to this matter. Complaints were received from North Wales that a minimum rate of 1s. 6d. per ton was being charged in that area, instead of 1s. for journeys under 20 miles. It was decided that the Council should also deal with this question.

DECONTROL OF COAL PRICES.

The announcement by the Board of Trade of the decontrol of coal prices as from the 1st of March next was reported. An important discussion on this subject took place, and the views expressed by the members of the Board with regard to the question of contracts were considered. A fuller report on this matter will be given in the next monthly statement supplied to members of the Council.

SPENT OXIDE.

A report of the investigations of the Spent Oxide Committee appointed by the Council was submitted. It was agreed that some relationship had been established between the price paid for the sulphur contained in spent oxide and the price of sulphuric acid. The Committee were warmly thanked for the work they had accomplished, and were asked to continue their investigations.

It was left with the Committee to appoint a Sub-Committee in order to confer with the Costing Committee of the National Sulphuric Acid Association, with a view to further investigating the actual costs of manufacture of sulphuric acid and the desirability of bringing about a further reduction in the price of acid.

DRAFT REGULATIONS UNDER SECTION 79 OF THE FACTORY AND WORKSHOPS ACT, 1901, WITH REGARD TO DANGEROUS AND UNHEALTHY INDUSTRIES.

The results were reported of a deputation from the National Gas Council to the Home Office, in an endeavour to obtain the exclusion of gas-works, as such, from the scope of the above regulations as at present drafted. The deputation was successful in obtaining a promise from the representative of the Home Office that amendments would be inserted to make it clear that the regulations were not intended to include gas-works (*qua* gas-works). The portion of gas-works where, for instance, sulphate of ammonia or concentrated ammoniacal liquor is manufactured and tar distillation carried on would however come within the scope of the regulations.

A special effort is being made by the Council to obtain exemption from the regulations of processes such as tar dehydration plants, where there is no "still" employed in the ordinary sense of the word. An endeavour will also be made to exempt small undertakings from the operation of the regulations.

RAILWAY RATES ADVISORY COMMITTEE.

Further hearings of the Committee on the 18th and 19th of January were reported, to consider the general principles underlying the railway companies' proposed revision of general railway classification of goods by merchandize trains. It was pointed out that the present classes had been translated into twenty-one revised classes, but that the load no longer corresponded in all cases. The railways had agreed that coal should be separately and specially dealt with, and on the assumption that the highest class of coal would not be in excess of No. 1 in the proposed classification—*i.e.*, the lowest class.

The Council expect to obtain an alteration in the carriage of coke from 6-ton loads to 4-ton loads, and are also pressing for reduced rates for coal and coke carried in train loads.

The Council are continuing to watch carefully the interests of the industry.

STANDARDIZATION OF COOKERS.

A letter was read from the Convener (Mr. R. J. Rogers) of the Sub-Committee appointed to investigate this question, giving an account of the work carried out by the Sub-Committee, and indicating that an interim report would probably be submitted before the end of the present month. The Council are greatly indebted to Mr. Rogers and the Sub-Committee for their excellent work on this question.

CARBON MONOXIDE INQUIRY.

It was reported that a letter had been received from the Board of Trade, inviting the National Gas Council to send two representatives to give evidence before the Carbon Monoxide Committee of the Board of Trade, which was sitting on the 10th inst. The Institution of Gas Engineers had been conferred with on this matter, and arrangements made for witnesses to attend before the Committee.

There is to be an informal meeting of the Yorkshire Junior Gas Association next Saturday at the gas showrooms in Darley Street, Bradford, when Mr. Arthur Coe, of Elland, will open a discussion on "Hydraulic Mains and Ascension-Pipe Troubles"; the aim being to invite a thoroughly practical debate. He will give a historical survey of hydraulic mains and ascension-pipe practice, with a view to demonstrating the essential simplicity of the fundamentals underlying their successful design, and deal with the application of these essentials in solving the problem of "stopped pipes" and "pitched hydraulics," with descriptions of several successful applications.

THE GAS INDUSTRY ON THE HEAT-UNIT BASIS.

Special Articles.—VII.

What the secretary of a prominent provincial gas undertaking thinks of the Gas Regulation Act, and all it provides for, is mirrored in the contribution to this series to-day. The writer is Mr. T. P. Ridley, the Secretary of the Newcastle-upon-Tyne Gas Company. Last October, in a paper before the North of England Gas Managers' Association, he made a complete survey of the Act, and then highly appraised its provisions. The present article may be taken to represent hardened views and further reflections, together with suggestions, which additional time has produced. Regarding the suggestions, there may not in one respect be complete agreement. To that exception reference is made in the course of an editorial article.

THE NEW ACT FROM THE SECRETARIAL POINT OF VIEW.

By T. P. Ridley, of Newcastle-upon-Tyne.

It is now five months since the Gas Regulation Act received the Royal Assent; and the intervening time has allowed it to be viewed in a detached manner, with the mind free from the details and numerous suggestions which were continually cropping-up before the Act was passed. I think it does not suffer by the lapse of time. The industry was fortunate in getting the Act passed when it did, as there would be more difficulty in getting it through to-day, in the present attitude of politicians towards financial matters.

Benefits of the Act and Points to be Kept in View.

I remain convinced that the selling of gas on a heat-unit basis instead of by volume is a step in the right direction, and that it will be for the benefit of both the industry and the consumer. The Act gives freedom from restrictions, and at the same time will bring about greater uniformity in the calorific value supplied by each undertaking, which will result in greater satisfaction to the consumer and a reduction in complaints. I trust the uniformity will not be confined to calorific value, but extend to specific gravity. Uniformity in both directions will mean much greater satisfaction to the public. The consumer has often been suspicious in regard to the quality of the gas; blaming it—often unjustifiably—and always looking with doubt upon his accounts, feeling that sometimes he was not receiving all he paid for. When he is buying heat units, he will be purchasing something much more definite than thousands of cubic feet of varying quality; and (though some do not agree) I still believe that eventually the public will understand, and be more satisfied with, the heat-unit basis of charge than with the present method. I consider we shall be in a much more favourable position to deal with existing consumers, and that the sales departments will be in a stronger position to deal with competition. In deciding the calorific value to be declared, it is to be hoped that all the factors will be taken into consideration, including the distribution system and the satisfaction of the consumer. This latter we must keep constantly in view; and, while satisfaction cannot be stated in specific sums of money, to fail to obtain it often means many times the sum which may have been saved on something which has been mistaken economy. Benzole extraction will not now have the same monetary attraction under the heat-unit basis of charge, and the production from gas-works is more likely to decrease than increase.

There will be difficulties in the transition stage, although the experience of the South Metropolitan Company appears to have been easy. Even if we are not as fortunate in our experience as that Company, let us make up our minds to make a success of the job whether we are in favour of the heat-unit charging or not. As each undertaking commences to charge on the heat-unit basis, every effort should be made to make matters easy for the consumer.

Account Forms where Meter Index-Cards are not Used.

The "B.C.G.A." are busy preparing literature for enlightening the public; and their work will be welcome. Gas accounts should be as clear as possible. In many portions of the Provinces the method of procedure in regard to meter-index taking and rendering of accounts differs from that of London. In London, the meter readers enter the indexes upon meter-reading cards on the consumers' premises, and the indexes are not shown on the accounts; whereas, in many places in the North, the meter readings are not entered on meter-reading cards on the consumers' premises, except by special request, which is very rare indeed. The indexes and consumptions are therefore shown on the accounts as rendered, and the form of account as shown at the foot of the page I would suggest in these cases.

The account would have explanatory information at the foot, which can be in such words and form as each undertaking thinks most suitable. The meter-reading cards taken out by the readers in Newcastle have columns for extension by the rental clerks of the charges for gas, rentals, &c.; and from these the account forms are filled in by adding machines, which at the same time, by means of carbon paper, provide on a sheet, that travels up a space after each line, a copy of the account—thus making-out the account and writing-up the ledger at the same time. The machines automatically add most of the columns; and the sheets form the debit side of a loose-leaf rental roll. The heat-unit basis means a little more clerical work, but not a great deal. I look forward, however, to relief in other directions by the reduction of complaints by more constant quality, which I think will be the result of working the Act. In regard to prepayment consumers, all we show on the receipts is the amount of money collected from the meter.

A Temporary Statistical Difficulty.

In the transition stage, we shall have difficulty in regard to statistics. We must in future work everything in therms, while our existing statistics are in thousands of cubic feet; but I do not see any unsurmountable difficulty in working into therms, with the aid of a comptometer, the figures for a few past years for comparison purposes. Most undertakings of importance have had calorific tests made during the last few years. When we have had a period of experience with the therm basis, the comparisons will certainly be much more reliable than with the "per 1000 c.ft. of gas," with large differences of quality between undertakings and between the various works of an undertaking.

Financial Benefits.

Of course, the great benefit to the industry is the fact that under section 1 financial stability can be restored, without which there could not possibly be proper progress and development. Provision is made whereby, with fair and reasonable administration of the Act, at least pre-war dividends should be payable. This will result in the capital (which has been so greatly depreciated by the reduced dividends paid during and since the war) increasing in value. But while the value of money is at to-day's figures, stockholders cannot look for a return to pre-war prices for their stock. Further, the investing public, after their recent experience, will be inclined to be somewhat timid about gas stocks. This should not be so with the Gas Regulation Act providing for revision of standards from time to time, and under which any abnormal circumstances arising in the future can be dealt with. I think, however, that there will be very few undertakings which will be issuing any ordinary or preference stocks for some time, as most will avail themselves of the recently enlarged proportion of borrowing powers obtainable.

The schedule prescribed by the Board of Trade to be filled up I consider to be well set-out for the purpose for which it is

Office Reference Numbers.	Date.	Meter Readings.	Gas Consumed.		Amount for Gas at 1s. 3d. per Therm.	Rentals—Net.				Other Charges Net.	Total.
			In Cubic Feet of 500 B.Th.U. per Foot.	In Therms (100,000 B.Th.U. per Therm).		Meter.	Cooker.	Fire.	Other Apparatus.		
	1920.	(Add two Cyphers.)	(Add two Cyphers.)		£ s. d.	s. d.	s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.
4 82 2	December	631	—	—	—	—	—	—	—	—	—
—	September	567	64	32·0	2 0 0	1 8	1 9	2 6	1 0 6	1 5 0	4 11 5
—	December	—	—	—	—	—	—	—	—	—	—
—	September	—	—	—	—	—	—	—	—	—	—
—	December	—	—	—	—	—	—	—	—	—	—
—	September	—	—	—	—	—	—	—	—	—	—

required—viz., to arrive at fair new standard and maximum prices. It will be noted, however, that the public lighting charges are not included in the "Total Expenditure." In the paper I read before the North of England Gas Managers' Association in October last [see "JOURNAL" Oct. 13, 1920], I referred to particular items which required care when filling up the schedule.

PRICE OF COAL AND STANDARD AND MAXIMUM PRICES.

Before leaving the subjects coming under section 1, there is one matter to which I would like to refer—Sir Dugald Clerk states in his article ["JOURNAL," Jan. 26, 1921] that "the possible price (of gas), of course, depends on the price of coal." Of this, there is no doubt. Generally speaking, it is found that the price of gas varies in somewhat definite relation to the price of coal. If the price of coal goes up or down it is reflected in the cost of other materials. I think it would be worth consideration that standard or maximum prices fixed under the Order should automatically rise and fall by so much per therm for each xd. which the cost of coal delivered into the gas-works varies from that on which the standard or maximum price is based. Such an arrangement would avoid the necessity of many applications for revision, but would still leave it open, in the event of the scale proving unsatisfactory, for application to be made for revision. It is the more essential at the present day, when no one knows whether the price of coal is likely to be increased or decreased; and as increases and decreases are of such considerable amounts, revision of the standard is rendered imperative without such an automatic variation. I understand that it is considered that the Board of Trade have not power to provide for this under section 1. It could, however, probably be obtained by application under section 10; but there are large numbers of undertakings which at present have not any other necessity to make application under section 10. I know there are some in the industry who do not agree with a slide on the basis of the price of coal; the objection being that it does not give an incentive to buy coal cheaply. But I do not consider anyone would be so unwise as to saddle his undertaking unnecessarily with high-priced gas by giving to the coalowner something more than need be given. There is not sufficient inducement to do so with a view to obtaining a higher dividend, because it would mean paying (say) 9d. to 1s. per ton extra for the coal to obtain an additional 2s. 6d. p.ct. of dividend. Apart from this, there is every incentive to good management. Those who do not like the proposal need not ask for it.

The uniformity which is brought about by the Act in regard to testing gas and gas-meters is also a step in the right direction. These matters will doubtless be dealt with by other writers.

VALUE OF SECTION 10.

Section 10 is a great boon from the secretarial point of view. Nearly everything that requires parliamentary sanction can now be obtained through it, and will be obtained at much less cost and with much less difficult negotiation with local authorities. The promotion of a Bill is a serious matter to contemplate. It generally means a very large amount of work, besides being very costly. I have in mind the case of a recent Bill which, though it eventually went through as an unopposed measure, cost the promoters well over £4000, which represented nearly 2d. per 1000 c.ft. on a year's consumption. But what is of more consequence than the question of the actual cost of legislation, is the advantage of consideration of problems by persons with accumulated knowledge of the requirements of the industry and—we shall hope—without being too much tied-up with precedents. In our own case in 1916, we desired, as the cheapest form of raising capital, to increase our borrowing powers from one-third to one-half. Many good commercial concerns have even larger proportions than one-half loan capital; but the House, on the grounds of precedent, would only agree to the increase for a temporary period—the loan capital eventually to be replaced by the usual proportions of capital stock and loans. Since then the General Act, entitled "Public Utility Companies (Capital Issues) Act, 1920," has been passed, allowing the increase in proportion to the loan capital. This will save many Private Bills and Special Orders under the Gas Regulation Act.

APPLICATIONS FOR BORROWING POWERS.

The question may arise with those companies requiring increased borrowing power whether they should seek it under the Public Utility Companies (Capital Issues) Act, or under the Gas Regulation Act. In the former case the Act only continues in force for five years from May, 1920, unless Parliament otherwise determines; but the expiration of the Act is not to affect the validity of anything done in pursuance thereof. It does not, however, appear clear as to what is to happen in the case of redeemable debenture stock issued under the Act (*i.e.*, in excess of one-third proportion) maturing after the expiration of the five years. Is it to be replaced by stock and loan capital in the old proportions, or can it be redeemed by the issue of other debenture stock in excess of the old proportions? All the advantages of the Public Utility Companies (Capital Issues) Act may be obtained by a Special Order under section 10 of the Gas Regulation Act, which is probably the preferable method, at any rate for undertakings requiring other provisions under the section.

AN INIQUITOUS RESTRICTION.

I trust the Board of Trade will, in Orders issued under section 10, amend the iniquitous restriction which the tar distillers managed to have thrust upon gas undertakings in regard to the purchase of tar.

A GOOD ACT.

I would say, in conclusion, that the Act, from the secretarial and commercial points of view, if reasonably administered is of enormous benefit to the industry. It provides the means for bringing back financial stability; greater facility for obtaining amendments of the undertakings' special enactments; greater freedom in methods of manufacture, which together with an incentive to increased dividends will lead to development and economy. The shareholders and the consumers gain thereby—more particularly the consumers.

PERSONAL.

Acting under medical advice, Mr. R. S. GARDINER on Nov. 30 last resigned his position as a Director of the British Gas Light Company, Ltd., and Mr. HENRY PULLMAN has been elected by the Board to fill the vacancy thus created.

At the meeting of the General Purposes Committee of the Darlington Town Council earlier this month, a presentation was made to Mr. FRANK P. TARRATT, of Newcastle-on-Tyne, who was till recently Gas Engineer at Darlington. The presentation took the form of a handsome silver rose-bowl, subscribed by the members of the Town Council; and it was made by Mr. C. F. Dixon, who referred to the valuable services rendered to the town by Mr. Tarratt. The Mayor also paid a tribute to Mr. Tarratt's work. In response, Mr. Tarratt expressed his gratitude for the gift, and for the kindness he had received in Darlington since he went to the town in 1898.

The Market Harborough Urban District Council have approved a recommendation of the Gas Committee that Mr. P. T. HARRIS be appointed temporarily as Works Manager, at a salary of £250 per annum, with house rent free and gas and coal.

Mr. R. SEYMOUR TOBEY has tendered his resignation as Engineer, Manager, and Secretary to the Horley District Gas Company, after a period extending over nearly nineteen years' service. Mr. Tobey was appointed Secretary to the Company at the beginning of April, 1902, and Engineer and Manager two years later. During Mr. Tobey's tenure of office, the growth of the Company has been very considerable; the sales of gas having more than trebled. At the time of the war, he had a most difficult task to maintain the supply of gas with a very depleted staff; and on some half-dozen occasions he took his part with the stokers, so that the supply of gas should not fail. Mr. Tobey has been appointed representative to a firm of makers of gas plant.

A report of the Gas Committee submitted at last week's meeting of the Stafford Town Council contained the resignation of Mr. W. M. VALON, the Gas Engineer and Manager, to take effect in three months. Alderman Young (the Chairman) stated that Mr. Valon had obtained a position with Messrs. Major & Co. The Committee have been summoned to meet at an early date to discuss the question of Mr. Valon's successor.

The Directors of the Sleaford Gas Company, Ltd., in their annual report, express deep regret at the loss caused by the retirement of Mr. HARRY WIMHURST last March, after having been Manager for 41 years. They say he has been an invaluable officer during this long period; and they hope he may live many years to enjoy his well-earned leisure, and to be able to give the benefit of his advice and experience in the management of the affairs of the Company.

Mr. DAVID MORTON, Assistant Manager at Kirkcaldy, has been appointed Manager at Kinross, in succession to Mr. D. CAMPBELL, who is taking up a similar position at Anstruther.

OBITUARY.

The death is announced, at the age of 78, of Sir WILLIAM B. RICHMOND, K.C.B., R.A., whose name has on various occasions been brought specially to the notice of "JOURNAL" readers through the active interest taken by him in the problem of smoke abatement.

Cleaning-out Tar Separators.

Writing in the "American Gas Association Monthly," Mr. H. H. Ferris, of Newark (N.J.), says the accumulation of coal dust or coke breeze and other solid matter in the bottom of tar-separators must be removed periodically. If the separators are pumped dry, so that labourers can go in to clean them out, it is in many locations liable to float to the surface, and serious damage may result—especially if constructed of steel or concrete. For several years, the Public Service Gas Company have been using for this work a 2 c.ft. bucket rigged on a suitable small derrick, which is hand operated by a small winch on the mast. The Hayward Company built a midget derrick, which is employed for the smaller tar-separators. A similar portable derrick with bigger radius, using the same winch, is now at work on the larger separators. The equipment has been taken round to the Company's works as needed. It saves about one-half the labour cost of this extremely dirty work, and enables the men to accomplish their task without covering themselves with tar.

COMMERCIAL GAS COMPANY.

Annual Report and Accounts.

THE following is the report for the year ended Dec. 31 last, which the Directors of the Commercial Gas Company will present at the meeting of shareholders on Thursday of next week.

The revenue account shows a profit for the year of £67,729, which, added to the balance of £46,380 brought forward from the previous year, equals £114,109. Deducting therefrom £27,310 for interest, and £30,049 in respect of the dividend paid for the June half year, there remains a balance of £56,749 available for dividend in respect of the December half year.

In consequence of the further increase in the cost of material and labour, the Company were compelled to increase the price of gas from 4s. 2d. to 4s. 8d. per 1000 c.ft. as from the taking of the indices at Midsummer, 1920; and the Board of Trade have, on the application of the Company, varied the Commercial Gas (Increase of Charges) Order, 1918, so that the Company, with the consent of the Board of Trade, are enabled to pay dividends, while the price charged for gas does not exceed 4s. 8d. per 1000 c.ft., at the rate of 3 p.ct. per annum on the 4 p.ct. stock, and £2 12s. 6d. p.ct. per annum on the 3½ p.ct. stock; and the Directors accordingly recommend the payment of dividends at these rates, both less income-tax. The balance of the net revenue will be carried forward to the credit of the current year.

The deduction under the provisions of the Coal (Pit's Mouth) Prices Order and Direction, 1919, of 10s. per ton of coal used for domestic purposes from the accounts with the colliery owners or dealers, ceased on May 12, 1920; and the sums so recovered have, in accordance with the instructions of the Controller of Coal Mines, been disbursed to the consumers of gas.

The Gas Regulation Act received the Royal Assent on Aug. 4, 1920. In accordance with the rules made by the Board of Trade, the Company have made application under section 1 of the Act for:

(1) The repeal of any enactments or other provisions requiring the Company to supply gas of an illuminating value of 14 candle power, and the substitution therefor of power to charge for thermal units supplied in the form of gas.

(2) The modification of the statutory or other provisions affecting the charges which may be made by the Company, by substituting for the standard price per 1000 c.ft. a standard price for each therm of 100,000 B.Th.U., with an addition to meet increases in the cost of manufacturing and supplying gas since June 30, 1914.

The standard price per therm proposed by the Company in substitution for the present standard price of 3s. 3d. per 1000 c.ft. is 15·6d. per therm.

Mr. H. E. Jones and Sir Frederick Green, K.B.E., two of the Directors, retire by rotation, and, being eligible, offer themselves for re-election. Mr. B. W. Ellis, one of the Auditors, will go out of office by rotation, and, being eligible, offers himself for re-election.

WILLIAM GRAHAM BRADSHAW, *Chairman.*

Gas Works, Stepney, Jan. 27, 1921.

The Accounts.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on Dec. 31 last amounted to £996,405; that £1,076,875 had been added by conversion, making £2,073,280; and that £254,298 remained unissued out of the total authorized capital (including premiums) of £2,340,000. The total amount borrowed at this date was £339,062 10s., and £135,937 10s. was added by conversion, making a total of £475,000, and leaving £114,226 to be borrowed, out of the £585,000 authorized. The capital account receipts amount, with premiums, to £2,606,065. The expenditure stands at £1,498,927, with a nominal amount of £1,212,812 added by conversion—together £2,711,739. There is thus a balance of £105,674 carried to the balance-sheet. A sum of £243 was during the year expended on freehold land, plant, &c.; £33,348 on new and additional buildings and plant; £10,033 on new and additional mains and services; £4045 on new and additional meters; and £7290 on new and additional stoves. But £11,040 is credited for steamships, and prepayment meters and fittings. The reserve fund amounted at the close of the year to £47,838, and the insurance fund to £29,429.

The following is the revenue account:

Receipts.

Sale of gas—			
Per meter (number in use, 116,049) at 4s. 2d. and 4s. 8d. per 1000 cubic feet	£811,273 6 9		
Public lighting and under contracts	25,117 7 0		
		£836,390 13 9	
Rental—			
Meters (26,197)	£9,181 8 6		
Stoves (91,786)	33,881 13 10		
Prepayment meters and fittings (89,257)	50,844 19 3		
Maintenance of mantles and fittings	2,459 0 11		
		96,367 2 6	
Residual products—			
Coke, less £24,369 8s. 7d. for labour	£293,368 16 8		
Breeze, less £5313 18s. 1d. for labour	6,153 6 4		
Tar	95,406 9 6		
Ammoniacal liquor and sulphate of ammonia	42,534 17 8		
		437,463 10 2	
Miscellaneous receipts—			
Rent receivable	£11 10 10		
Transfer fees	53 10 0		
		65 0 10	
Total receipts			£1,370,286 7 3

Expenditure.

Manufacture of gas—			
Coal and oil, including dues, carriage, unloading, and trimming	£627,863 7 7		
Salaries of engineer and officers at works	14,326 0 2		
Wages (carbonizing)	62,468 6 3		
Purification, including labour	8,503 12 11		
Repair and maintenance of works and plant, materials and labour (less £3176 19s. 4d. received for old materials)	257,076 5 8		
		£970,237 12 7	
Profit sharing		4,883 4 1	
Distribution of gas—			
Salaries and wages of officers (including rental clerks)	£32,787 2 4		
Repair, maintenance, and renewal of mains and services, material and labour	40,895 13 3		
Repair and renewal of meters	13,111 4 2		
" " " " stoves	44,749 7 4		
" " " " prepayment meters and fittings	55,563 13 3		
Maintenance of mantles and fittings	4,561 13 7		
		191,068 13 11	
Public lamps—lighting and repairing		14,674 6 8	
Rent, rates, and taxes		49,577 10 3	
Management—			
Directors' allowance	£4,750 0 0		
Company's Auditors	150 0 0		
Salaries of Secretary, Accountant, and clerks	5,432 19 8		
Collectors' salaries and commission	6,074 9 6		
Prepayment meter collection	22,333 2 0		
Stationery and printing	5,452 14 2		
General charges	7,838 1 5		
		52,031 6 9	
Bad debts		122 18 11	
Law and parliamentary charges		338 10 2	
Superannuations and Allowances, and Workmen's Benefit Society, &c.		17,638 6 1	
Official officers, &c.		250 3 3	
National Health and Unemployment Insurance		1,629 17 11	
Allowances to employees on active service		105 0 3	
Total expenditure		£1,302,557 10 10	
Balance carried to net revenue account		67,728 16 5	
		£1,370,286 7 3	

Total wages paid in 1913, £119,010
" " 1920, £381,962
Total salaries paid in 1913, £22,976
" " 1920, £63,071

Statement of Coal and Oil.

—	In Store Dec. 31, 1919.	Received During Year.	Carbonized During Year.	Used and Sold During Year.	In Store Dec. 31, 1920.
Coal—tons	25,435	242,425	235,406	628	31,826
Oil—gallons	252,751	1,206,997	1,089,266	..	370,482

Statement of Residual Products.

Description.	In Store Dec. 31, 1919.	Made During Year.	Used During Year.	Sold During Year.	In Store Dec. 31, 1920.
Coke—tons	5,299	158,899	17,874	139,424	6,900
Breeze—tons	6,540	17,387	..	19,727	4,200
Tar—gallons	842,949	2,293,043	..	2,567,648	568,344
Ammoniacal liquor—butts of 108 gallons	9,511	75,707	71,313	..	13,905
Sulphate of ammonia—tons	187	2,334	..	2,291	230

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
4,339,616	70,716	3,848,686	3,984,496	3787

The last statement is the balance-sheet, which gives the value of the stores in hand at the close of the year, as follows: Coal, oil, &c., £88,290; coke and breeze, £10,732; tar, ammoniacal liquor, sulphate of ammonia, &c., £27,002; sundry stores, £69,067—total, £195,091. The figures this time last year were: Coal, oil, &c., £44,477; coke and breeze, £9155; tar, ammoniacal liquor and products, sulphuric acid, &c., £26,532; sundry stores, £62,498—total, £142,662.

The wedding took place last Saturday week, at St. Mark's Church, Newport (Mon.), of Mr. Lionel V. Corfield and Miss Kathleen Hazell, second daughter of Mr. T. H. Hazell, Secretary of the Newport Gas Company.

There is to be a discussion at the meeting on Thursday, the 24th inst., of the Illuminating Engineering Society, on the use of light as an aid to publicity, including "Shop-Window and Spectacular Lighting," introduced by Captain E. Stroud, and "Illuminated Signs, &c.," by Mr. E. C. Leachman.

There is to be a visit next Saturday afternoon by members of the Scottish Junior Gas Association (Western District) to the Greenock Gas-Works, the plant at which was fully described by Mr. James Jamieson in his Presidential Address to the Association. [See "JOURNAL," Nov. 10 last, p. 334.] There will be a business meeting in the Royal Technical College, Glasgow, on Saturday, March 5, when Mr. S. H. Hunter, of the Glasgow Corporation Gas Department, will read a paper on the "Selling Side of the Gas Industry."

ELECTRICITY SUPPLY MEMORANDA.

THE Electricity Commissioners, with Sir John Snell in the chair, have sat several days at Liverpool to consider the scheme for a joint authority, under the Electricity Supply Act of 1919, for the Mersey and West Lancashire provisionally defined district. Different from the Bristol fiasco, on this occasion the promoters of the joint authority scheme were represented by Counsel—Mr. Honoratus Lloyd, K.C.; and so also were the objecting authorities, and those who were present for the protection of their interests. Mr. Tyldesley Jones, K.C., and Mr. Jeeves were among the legal representatives. The promoters came with a scheme for a large super-power station; so that there was plenty upon which the Commissioners could work, though the evidence did not comprehend all they want to know. The scheme contemplates a large station, probably in the Liverpool area, with an ultimate capacity of 250,000 KW., and the laying of transmission lines to the various areas. The proposal is that the station should be progressively constructed in 25,000 KW. units. The capital cost is estimated at £4,500,000—that is, for the first four sets; the amount being made up of £3,000,000 for the four units, and the balance for the high-pressure transmission lines and transformers. Like all vast projects of the kind—covering so much area—it is next to impossible to get all the authorities to see things in the same light, and so there are objectors to the one generating scheme for the Mersey and West Lancashire area. While Liverpool and the greater number of the local authorities are in favour of the scheme, Birkenhead, Wallasey, and Southport are desirous of keeping outside it. Birkenhead thinks its side of the Mersey should have a smaller scheme of its own. Bootle considers that the consumers of electricity in the borough would be served by an extension of the Council's undertaking just as well as by inclusion under the scheme. Southport also prefers to stand outside, and suggests that the exclusion of its area would make no material difference to the prospects of the capital scheme. The Commissioners have a weighty responsibility in the matter of adjudging between the various contentions and of determining who is right and who is wrong. To get them all to be willing participators in one scheme will be difficult.

Not Unanimous.

Then there is the financial question, and never could it have been more embarrassing than in these days. Reading between the lines, we seem to detect the feeling of the Commissioners that they are in a bit of a quandary as to the monetary aspect of the schemes. Questions put by Commissioners during the proceedings appear to indicate this. When Mr. F. C. Wilson, the Chairman of the Liverpool Tramways and Electricity Committee, was under examination, Sir Harry Haward asked if the actual taking-over of the existing generating stations was essential to the satisfactory working of the scheme. Mr. Wilson replied that they must come under the control of the joint authority, who would have to buy them out. He does not think control of the working of the stations would be satisfactory; there must be possession. In his view, most of the capital required would be needed for extensions even if there were no scheme. The next day Sir John Snell pursued this point, by saying that the Commissioners desired to know what would be the amount required for extensions of individual undertakings, if no schemes were brought into being. Well may the Commissioners be desirous of obtaining this information, with money what it is, and costs what they are. To-day the best must be done on the most economical lines. The ideals of other days may not be economically attainable in these. Then again later Sir John said the Commissioners wanted particulars of the programme proposed—how much would be done in the first, second, and third years; how much money would be spent; and how the expenditure would be met. No answers could then be given. On the third day, Sir John again pressed the point as to whether the promoters were prepared to submit a statement showing the construction and financial programme. And Mr. Honoratus Lloyd had to confess to inability. From his confession it appeared that he and those responsible for the scheme had had a "terrible night" trying to reply to the request for financial information; but they found it was quite impossible. He added that until the joint authority was established, and was able to ascertain precisely the extent of co-operation to be expected from the local authorities, any figures put forward might be purely fanciful. This is the crux of the matter; and the financial question is the one upon which rests justification or otherwise for changing existing conditions. So many are in favour of combination of generation, separating generation from local distribution, with the discounts upon concentrated generating economy of running two separate businesses, and transmitting energy long distances; but no one can yet say that any real financial advantage is going to be derived from the change. No one district has been taken for experimental purposes before launching-out into universal plans, against which trial proceeding stands the fact that no two districts are alike. All is in the dark as to financial outcome; and in the end it may be electricity will not be supplied any cheaper than, if as cheap as, under local generation—at any rate in the large places. The prophets of economy are only working upon the concentration of generation, upon a hoped-for improved load through diversity, and the use of large generating sets. But there is a limit to the economy of a generating set.

The Crux of Finance.

The Electricity Commissioners have in their diaries provisionally fixed June 7 for opening the inquiry to be held by them with respect to a scheme for London and the Home Counties; but schemes and representations in regard to the proposed area are to be in their hands not later than March 31. Meanwhile there has been published a preliminary outline of the scheme which is being put forward by the Conference of Electricity Undertakings for the constitution of a Joint Electricity Authority for London. The London and Home Counties electricity district has an area of about 1660 square miles, a population of some 8,000,000, and a total assessable value of £68,663,477. It comprises 160 local authorities and eight county councils, including the London County Council. The scheme proposes that an authority shall be constituted consisting of twenty-seven members, appointed as follows:

The Scheme for London and Surrounding Territory.

1.—By authorized undertakers—	
Local authorities within the County of London. . .	8
Do. without the County of London	4
Companies in the area	4
2.—By purchasing authorities, county councils, and local authorities, not being undertakers—	
London County Council	3
Corporation of the City of London	1
Local authorities within the County of London. . .	2
Local authorities without the County of London, including county councils	2
3.—By the Minister of Transport—	
Representatives of railway companies and other large consumers, and other interests, including labour .	3

Other clauses of the scheme deal with the powers, privileges, and duties which would be conferred upon the joint authority under the Act of 1919—these enabling the authority particularly to construct generating stations, main transmission lines, and other works necessary to give effect to the engineering proposals included in the scheme; to acquire undertakings or parts of undertakings of authorized undertakers and power companies within the area; to supply electrical energy within or without the area of supply; and to furnish a supply of electrical energy in accordance with the provisions of section 12 of the Act.

There are electricians who have no desire to see the working man provident. They would like to make his house all-electric; and then let him find out the cost by bitter experience. They would put in electric lighting, electric radiators, an electric-oven and all its appurtenances, and electric water-heating arrangements, and perhaps such sundries as electric irons, a vacuum cleaner, egg-boiler, shaving-pot, pipe lighter, and various other luxuries. The working man in their view should be electrically equipped after the manner of a multi-millionaire. But many a millionaire, multi or otherwise, knows better than to be saddled with all the prescriptions of some ardent electrical men. According to the "Evening News," one of the Ilford firemen has an electric radiator in his cottage; and in thirteen weeks he has consumed £12 worth of electricity, which has to be paid for by the ratepayers. This is nearly £1 a week for one radiator. Supposing the units of current are priced out at 2d., this would mean 1440 units in the quarter for the single radiator, or 110·8 units per week, or 15·8 units per day, and a 2 KW.-hour radiator would on this amount of energy run about eight hours a day. If electricians are seriously going to try to get working men to use electric heating, they must educate them up to looking upon it as a luxury, to take it in small intermittent doses, and to go cold in the intervals. Of course, this will require some doing; but £1 a week for one radiator out of a working man's pocket for constant heating in cold weather does not come within the region of common-sense.

The Working Man and Electric Heating.

Some time ago, the Profiteering Committee startled the electrical world by accusing the British electric lamp people of making enormous profits, which charge was indignantly denied. Since then prices of materials have come down somewhat, but the costs of labour have ascended. Correspondents in the electrical papers have alleged that the quality of the lamps has got on to the road that leads to speedy destruction. This, of course, would increase the demand for lamps in a way not pleasant to the users, but who, having their premises wired, have to bow to the inevitable, and buy two lamps for every one purchased in days when the average lifetime was better. Now we see that the Electric Lamp Manufacturers' Association have announced reductions in price ranging from 18 up to 28·6 p.ct. for lamps of the gasfilled type (the latter reduction for lamps of the larger size of 100 watts at high and low voltage), and from 8·3 to 16·7 p.ct. for lamps of the vacuum type (the latter figure for the smaller sizes of from 10 to 30 watts at voltages of 100 to 125). No definite reason has been given for this "voluntary" reduction; but pressure is coming from some quarter. Are the Germans well in the market again? Meantime, complaint continues as to the comparatively short lives of the well-known makes of lamp; and people who contract for the maintenance of lamps are not overjoyed with their experiences.

Reduction of Lamp Prices.

"Consternation" Among Gas Consumers.

Another of those curious paragraphs referring to gas to which we have previously called attention has appeared in the "Electrician;" and this particular paragraph states something which is news to us. It tells us that there is at the present time great "consternation" among gas consumers all over the country, at which our contemporary is not surprised. We have not noticed more "consternation" among gas consumers "all over the country" than among electricity consumers, although we pride ourselves upon keeping a fairly sharp look-out upon gas affairs and movements. But after our previous experience of the expressions of opinion of our contemporary, we are "not surprised" at the writer of the "Notes" in it "not being surprised." There must be a powerful magnifying glass in the office of the "Electrician." The cause of the "consternation," it appears, is owing to "some"—not "all over the country"—of the gas supply companies having frankly put up their prices, while others, following a course permitted by recent legislation, have been changing-over to a new system of charging—"a policy which has the dual result of puzzling the consumer, and of more or less camouflaging an increase." How silly for an electrician to write like that! The Gas Light and Coke Company has put up its price 120 p.ct. on pre-war charges per 1000 c.ft. Some undertakings nearer the coal-fields have not gone to that length. As explained in the "JOURNAL" last week, part of the increase is due to exceptional causes, one of which is a 20 p.ct. increase in gas business in two years. Only one company up to the present has changed-over to the heat-unit basis of charging; but we hope to see several more doing so before long, and all within reasonable time. That one company is charging 10½d. per therm, or 100,000 B.Th.U. supplied. We fail to see that this system of charging is any more "puzzling" than charging by the electrical unit, and not half so puzzling as many of the complex tariffs of electrical origin. Perhaps our contemporary, judging from the character of the paragraph, has more difficulty in seeing the matter in the same light as we see it.

"A Figure of Merit."

The "Electrician" goes on to say that "there are many cases where it can be shown there is a direct saving on the revenue account by using electricity for domestic purposes rather than gas." But there is an excellent display of discretion in not saying what are those domestic purposes. This is how it is said to be possible to ascertain whether or not there will be a direct saving: "The figure of merit [whatever that may mean], given by dividing the price per unit of electricity in pence into the price per 1000 c.ft. of gas in pence is one way of doing this. When the figure is between 24 and 30, a domestic electric load should be easily obtainable, and the ease increases as the figure of merit rises." Supposing 12d. is charged per unit of electricity and 60d. for gas: 60÷12=5. Supposing 2d. is charged for heating units and 60d. for gas, 60÷2=30. The 30 is evidently a figure of great merit. We want to go further than this to get a genuine "figure of merit." Supposing the gas at 5s. per 1000 c.ft. under the new order of continuous calorimetric testings, proves to be of 500 B.Th.U. per cubic foot. The 1000 c.ft. would be equal to 500,000 B.Th.U., or 5 therms; and the cost would be 1s. per therm or 100,000 B.Th.U. A unit of electricity has a potential heating value of 3420 B.Th.U. Thus 100,000÷ by 3420=29. 29 units of electricity at 1s. cost 29s., as the "Electrician" will be able to appreciate. 29 units at 2d. cost 4s. 10d. And the only company supplying at present on the heat-unit basis is selling 100,000 B.Th.U. for 10½d., at to-day's costs of production. On which side is the "figure of merit"? Electrical administrations—even those of small undertakings—we think, will regard the "Electrician" as a very bad counsellor on questions of policy. Time will show where the merit of economy is to be found when gas undertakings get into full swing with heat-unit trading.

Midland Association of Gas Engineers and Managers.—Mr. T. Thornton, of Rowley Regis, the newly-appointed Hon. Secretary of the Association, announces that the annual general meeting will be held at the Grand Hotel, Birmingham, on Thursday, the 3rd of March.

Edinburgh Gas Engineership.—It was reported at the meeting of the Edinburgh Corporation Gas Committee on Thursday last, that twenty-one applications have been received for the position of Engineer and Manager of the gas undertaking, shortly to become vacant owing to the retirement of Mr. Alexander Masterton.

Use of Gaseous Fuel in Steel Making.—Before the members of the Sheffield Association of Metallurgists and Metallurgical Chemists, Prof. R. V. Wheeler, of the Sheffield University, read a paper on the "Composition of Gaseous Fuel in Relation to the Processes of Steel Manufacture." On all counts, he said, considering only the furnace efficiency of the gases, hydrogen stood condemned as a furnace fuel. The efficiency for which a manufacturer strives, however, was economic efficiency; and it was quite possible that a gas high in hydrogen might, under certain circumstances, be cheaper per ton of steel—for example, if ammonia recovery was attempted—than a gas produced without the aid of steam. Then, naturally, the demonstrably greater fuel efficiency, or "furnace efficiency," of carbon monoxide would be of little avail. This was an aspect worthy of discussion by steel makers.

LEEDS GAS EXHIBITION.

Remarkably Complete Demonstration of Gas Possibilities and Uses.

At Fenton Street Artillery Barracks, Leeds, from yesterday (Feb. 15) to Saturday, Feb. 26, an exhibition of gas appliances is being held under the auspices of the City of Leeds Gas Department. The exhibition was opened on Tuesday by the Lord Mayor of Leeds (Mr. A. Braithwaite), in the presence of a large company, a report of which proceedings will be given in the "JOURNAL" next week.

The drill hall at Fenton Street is admirably suited to exhibition purposes, though a very much larger space could have been utilized, had it been available. The big bare hall, with concrete floor, and the grey doors and fittings so familiar to Territorial artillerymen, has been converted into a particularly tasteful exhibition hall. Preparations have been going on for about a month; and the highest credit is due to Mr. C. S. Shapley (Engineer and Manager of the Leeds Gas Department) and his helpers, and also to the Contractors (Messrs. Armitage & Hodgson), for the manner in which they have transformed the place into a centre of attraction. There is every inducement for the public to visit the exhibition and spend an interesting time, with the maximum possible comfort at such an event. The band of the Coldstream Guards, under Lieut. R. G. Evans, is in attendance, rendering first-class concerts in the afternoon and evening each day. The preparations have been greatly assisted by the ready support and active help of the Chairman of the Gas Committee (Alderman W. Penrose Green, J.P.), and the Deputy-Chairman (Alderman G. Ratcliffe, J.P.), both enthusiastic believers in the efficacy of gas for power, heating, and light.

The exhibition includes 34 distinct stands, in addition to a handsome *café*, a lecture-room, and the private office of Mr. Shapley. The stands are all commodious and airy, with plenty of room for visitors to move about in inspecting the exhibits. The stands are ranged completely around the large hall, and down the centre. The two main gangways are 13½ ft. wide, those at the ends of the hall 12 ft. wide, and the centre cross-gangway 7 ft. in width; so that there is ample room for a large crowd of visitors to move in comfort. All the stands have been erected in Beaver boarding and white plaster; and the final appearance, with Greek pillars dividing each stand, is extremely artistic. The five stands occupied at one end of the hall by the Leeds City Gas Department have a handsome façade bearing the City coat of arms. There is a graceful uniformity in the construction and exterior appearance of all stands which is pleasing and restful to the eye, and in happy contrast with the medley of designs and colours seen in more general trade exhibitions. Experienced visitors, at a private view of the exhibition on Monday, declared with emphasis that this was the finest gas exhibition that has been held in the country.

The exhibition is designed to demonstrate to both the domestic and the industrial public the many uses of gas and gas apparatus; and there are features which are entirely new to most folk outside the profession. Probably one of the most effective of all arguments in favour of gas as an illuminant, in competition in the public eye with the convenience of electric light, is the pneumatic wall-switch method of automatic gas lighting (both as an illuminant and for gas-fires), which is in very considerable use in all parts of the exhibition. Some 500 gas and 50 water connections have been laid on to the hall specially for the exhibition, by the Gas Department. The great bulk of the chief exhibits are in working order, so that demonstrations can be given freely.

In addition to the lectures, cinematograph exhibitions are being given daily, showing the processes of the manufacture of gas and various gas appliances. The exhibition is thoroughly representative of convenience, economy, efficiency and public health in every phase. The widespread interest which the exhibition has aroused is evidenced by the widely-representative character of the exhibitors, as standing for the British gas industry generally, and by the attendance of representatives of the press beyond the confines of Leeds at the private view on Monday.

THE EXHIBITS.

Stands Nos. 1 to 5, of the Leeds Gas Department, have been arranged by, and are under the personal supervision of, Mrs. C. S. Shapley, the wife of the City Gas Engineer and Manager, who is enthusiastic in her husband's support in the determination to make the exhibition an immediate success and a show which will have lasting results to the benefit of the gas industry and the public alike. Stand No. 1 is a section of a bathroom; No. 2, a section of a kitchen; No. 3, a section of a middle-class household lounge; No. 4, a dining room; and No. 5, a bedroom. All these rooms are being equipped with the full complement of possible gas appliances suitable to the nature of the room, for lighting, heating, and water heating. Messrs. Marsh, Jones, and Cribb, of Leeds, have supplied the tasteful furniture of these rooms. The bathroom is fitted with enamelled bath and washhand basin, geyser, gas-fire, towel rack, and inverted brackets, all connected up with the handy pneumatic wall switches. The room has been panelled out in grey and white, giving a cleanly and pleasing effect. The kitchen has a large gas-cooker in a tiled brick recess, and at the side of the cooker, and brought out to line with it, a gas-fire has been fixed. Raised on the brickwork behind the fire is a hot-water circulator, and in another corner near the

cooker is an incinerator. Near the window is an enamelled sink, above which is an instantaneous hot-water boiler. In the drawing room, attention is drawn at once to an armour-bright gas-fire, backed by a beautiful marble filling for the chimney piece. A chaste pendant and wall brackets, controlled by pneumatic switches, provide the lighting. The dining room is fitted similarly in gas appliances; the fixtures varying in design to suit the purpose of the room. The model bedroom is fitted with a semi-circular gas-fire, washhand basin, and the usual bedroom furniture. Another exhibit of the Leeds Gas Department, at Stand No. 34, is that of the products obtainable from coal, and the wastage which occurs by the burning of coal in open firegrates as against the burning of gas. The point is driven home that not only is health imperilled by the pollution of the atmosphere with sulphur, soot, and smoke, but the value of the saving from a commercial point of view is seen by an extensive display of drugs, dyes, chemicals, &c., lost to the community in open coal burning.

Stands Nos. 6 to 8 are held by the Parkinson Stove Company, Ltd., of Stechford, near Birmingham, who show a comprehensive display of gas-heated labour-saving devices for cooking, heating, lighting, and hot-water supply. The fires include the "Conrad" (convection-radiant) type, diffusing a warm current of pure air throughout the room; the "Edmund," "Compass," and "Built-in" fires, of special design appeal to all who desire to use a fire-place for gas or coal at will; and the handsome "Welbeck," "Westminster," "Haddon," and "Chatsworth" fires. The cooking stoves are the "Crown," "Holborn," and "Stechford" patterns, each with distinctive advantages. The hot-water apparatus includes geysers for instant supply, circulators, wash coppers, and the "New Cottage" heater. The show includes also features in both indoor and outdoor shop lighting. Messrs. William Edgar, of Hammersmith, at Stand No. 9, are showing "Instant" and "Waterloo" geysers of the sealed type; the "Blenheim" gas-heated hot-water circulator; the "Blenheim" gas-fire; street lamps; the flashing pipe lighter, and the "Brentford" gas lighter, which lights about ten coal-fires quickly at a cost of a penny.

At Stand No. 10, Messrs. R. & A. Main, Ltd., of Falkirk and London, display various gas novelties, including the "Entente" inset gas-fire, which can be adjusted to suit grates of various heights and depths; the "Poet" series of artistic fires for interiors; the "St. Magnus" gas-heated steam radiator fitted with the latest automatic double injector valve; the "Fire King," "Gothic," and "D.S.O." types of fire of artistic and pleasing design. At Stand No. 11 the same firm have kitchen and household appliances, of which the chief features are the "New Main" high-grade gas-cookers (which are represented by a variety of types and sizes, illustrating their applicability to varying conditions); the "Tophole" gas-iron; the "Energy" circulating boiler (shown in operation); two gas-mantle registers; and the "Dandy" wash boiler.

Stands No. 12 to 14 are occupied by Messrs. Flavel & Co., Ltd., of Leamington, who show a selection of their cooking and heating appliances, manufactured on the mass-production principle. They include the "Imperial" cookers, the "Imperial" radiator, and the "Utility" hot plate.

Messrs. James Stott & Co., of Leeds, at Stand No. 15, show the "Stott" patent fool-proof gas-heated instantaneous water-boiler; patent self-regulating coffee, milk, or tea urns; patent combination coffee-making machine and urn; safety glue cabinet; and self-acting gas governors. At Stand No. 16, Messrs. Falk, Stadelmann, & Co., of London, are exhibiting "Veritas" and other gas-mantles, upright and inverted incandescent burners, and glassware and gas-fittings. A show-case displays the concomitants of a mantle and the processes of production.

At Stand No. 17, the Clarke Syphon Stove Company, Ltd., of Warrington, exhibit the "Phœnix" and "Luminex" stoves, the "Simplex" radiator (for private rooms, shops, offices, &c.); the "Sunshine" and "Super-Sunshine" heating stove; the "Veneto" radiator; the "Chester," "Bijou," and "Midget" series of small artistic gas-fires; the "Fairy" gas-iron; the "Rapid" and "Chef" toasters; the "Washday" boiler fitted with draw-off tap, a boiler being supplied for the housing schemes; grillers, boiling burners, high-grade cookers, &c.

Messrs. James Milne & Son, Ltd., of Leeds, at Stand No. 18 are displaying working specimens of their seven-light "Lumex" lamps with lettered opal screens; "Lumex" service governor with pressure recorders at inlet and outlet; a suite of conversion fittings on brass rail; a Series 2 "Lumex" lamp; one No. 510 lamp, without globe or mantles; and a large number of gas and distribution necessities, pressure-gauges, pumps, meters, &c. Stand 19 is that of Jackson Boilers, Ltd., of Leeds, showing the firm's patent water-boilers for hotels, restaurants, cafés, industrial canteens, &c. For the special attention of the catering trade, they have on view the "Jackson" café fountain, fitted complete with coffee-making machine and milk urn. The "Jackson" instantaneous geyser is also shown. Stand No. 20 is an exhibition of "General" gas cooking, warming, and water heating appliances by General Gas Appliances, Ltd.

Radiation, Ltd., and their subsidiary Companies have a large number of stands. Stand No. 21 of this series deals with the part of gas in the national housing scheme, No. 22 is a completely furnished and gas-equipped lounge, No. 23 is an exhibition of hotel and canteen appliances, the particular equipment on show being for a supposed hotel accommodating about 150 guests. The exhibit includes gas hotplate, three oven gas-ranges, roasting ovens, stockpot stand, gas grillers, vegetable steamers, with cisterns; gas-heated carving table; pastry oven; gas hotcloset with Bain Marie and gas-toaster, for stillroom use; fish frying range, vegetable boiler, &c., suitable particularly for hospitals; and six different kinds of tea water-boilers.

The show at Stand No. 24 is of industrial furnaces, covering an extensive range of heat-treating processes. The only exhibit of natural-draught furnaces is the Fletcher-Russell "Muffle" furnace for annealing, case hardening, and tempering. In furnaces operated by low-pressure gas, Radiation, Ltd., are showing John Wright's "Fanpress" oven for annealing; Richmond's patent "L.P.G.A." (low pressure gas and air) oven furnace for reheating, annealing, case hardening, &c.; and the "Davis" natural-draught oven for hardening carbon steel. In gas and air blast furnaces, there are Brayshaw's furnace for cutlery forging; Brayshaw's patent twin-chambered furnace No. 2, heated by gas at normal town pressure and air under 1 lb. per sq. in. pressure; the Davis twin-chambered "H.S." steel furnace, giving a temperature of 1500° C. in the lower oven and 1000° C. in the upper oven; Davis tool-makers' outfit—a semi-portable outfit including small oven furnace, smith's hearth with blowpipe and flexible connection, and a belt-driven blower, with small motor attached; Fletcher, Russell, & Co.'s hand tilting metal melting furnace—a one-man type taking crucibles up to 250 lbs. capacity; Richmond's natural gas-oven; Richmond's rivet heating furnace; Wright-Morgan tilting crucible furnace for melting copper, gun-metal, brass, aluminium, &c., and John Wright & Co.'s high-speed steel furnace. The sundries on this stand include Brayshaw's gas-flow indicator; Fletcher, Russell, & Co.'s blowpipes, bunsen burners, and gas-heated apparatus suitable for laboratory and small works uses. Under the Radiation, Ltd., series, also, Messrs. Wilsons & Mathiesons, Ltd., feature the "Sunbeam" gas fire; the "Ten Minutes" circulator cylinder; the "Sola" fires; and the "Advance" cooker.

Messrs. Arden Hill & Co.'s show of gas-cookers features the "New Acme," including the "Eagle" high-efficiency hotplate with low gas consumption. In gas heating this firm display ventilating gas-grates, giving radiant heat without drying the air, and gas-heated steam radiators. For hot water supply they have the "Zenith" and "Acmefont" combined gas-heaters and storage tanks, and the "Acmefont" circulating boiler for use with an existing storage tank. In the way of general housing equipment, they show gas-cookers specially constructed with a view to the new housing schemes; gas-fires, including built-in grates; and gas-heated wash boilers, constructed throughout of cast-iron with wooden lid for use as a table where space is limited. The firm also show canteen equipment.

At the Stand No. 2, of Messrs. John Wright & Co., the specialities are: For warming, the "Classic" gas-grate; the new "Thermo-XX" radiants, fitted only in these grates, giving perfect radiating efficiency throughout the room with any quality or pressure of gas. The grates include Wright's patent "Injector-Ventilator" and the new patent adjustable flue. The burners of the grates are silent, and of either "Simplex" or "Duplex" type. The "St. Andrew" gas-steam radiator is shown as a means of warming larger buildings—such as churches, factories, meeting halls, retail stores, &c. The firm show in cooking apparatus the "Eagle" gas-range, the "New Century Eureka" cooker, and the new "Compact" cooker, with hotplate and gas-burners of novel design, and to which side extension plates can be fitted. On another stand devoted to hot-water apparatus, they show their "B.Th.U." combined circulator and storage tank, with a patent thermostat to control the gas consumption and prevent waste. The firm are also showing with their other appliances the "Novo" wash boiler.

At Stand No. 28a, the Richmond Gas Stove and Meter Company are showing their "Bungalow" cooker in five sizes; the "Silent" gas-fire of the period series; gas-heated wash boilers—the "Economica" and "Blackfriars" series; "Dee" (open type) and "Don" (closed type) geysers; the "Thames" geyser, providing hot water to any number of taps—sink, lavatory, bath, basin, or elsewhere; gas-heated hot-water circulators; and the "Lyn" boiler. Messrs. Fletcher, Russell, & Co. exhibit cookers, fires, water heaters, radiators, smoothing irons, and a gas-heated self-contained circulating system.

The Davis Gas-Stove Company are featuring "Perfecta," "Shamrock," "Midget," and "Cambridge" geysers in various sizes; gas-fires of the "Shakesperian" series with silent burners of simplex or duplex type, and fitted with the new "C" type radiator and gas and air adjusters; the Davis "A" pattern silent burning fire, with standardized and interchangeable parts; the Davis new series of self-contained fires; the "N.H." gas interior and mantle register; the "New Davis" cooker, with hotplate adjustable to two raised positions; the "Wee," "Tween No. 1," and "Tween No. 2" small cookers; the Davis wash boilers of heavy galvanized iron with tinned copper pan and copper lid; and the various Davis patent steamless radiators requiring no central installation.

The Ramie Company, Ltd., of Bredbury, Stockport, at Stand No. 25, have a working exhibit of the Zeimar incandescent mantle, displaying the processes from the raw China ramie grass and the knittings and rare earths from which the mantle is made. Messrs. Kayll & Co., of Leeds, at Stand No. 31, show Vitreosil globes, shades and mantle protectors, chimneys, bowls, and radiators.

Of course, the British Commercial Gas Association have a stand, No. 26, close to the door, with their usual clever and

attractive display of the multitudinous uses of gas. The stand is a general information bureau on gas matters of any kind.

One of the most charming features of the whole exhibition is the all-gas bungalow erected in the centre aisle by Radiation, Ltd. The bungalow, which is of wood, and is surrounded by a beautiful little garden and climbers of real and artificial plants (arranged by Mr. W. Agar, Assistant Parks Superintendent to the Leeds Corporation), contains sitting room, two bedrooms, bathroom, kitchen, hall, and various pantries, all suitably furnished with a view to artistic attraction coupled with obvious comfort, and entirely served by gas for lighting, heating, and water heating. Every modern gas appliance which could be of service in an average middle-class bungalow is found in this house, in full working order.

AN EFFICIENCY EXHIBITION AT OLYMPIA.

THE "Daily Mail" Efficiency Exhibition now being held in Olympia, and which is remaining open until the 26th inst., was organized as the result of deep-seated conviction that at no time in the industrial history of this country has the need for a higher standard of efficiency been so vital and urgent as now. Efficiency, of course, means just everything that really counts; and it must be sought in all possible directions. Therefore one would expect an exhibition having for its object an increase in efficiency to be varied and important. The display of two hundred or so exhibits at Olympia is both.

It is impossible to dwell long upon the subject of efficiency without one's thoughts being turned to gas; for gas offers the most powerful aid to efficiency in so many ways. Some of these are excellently illustrated by the South Metropolitan Gas Company, whose well-arranged stand in the gallery is devoted mainly to demonstrating the efficient application of gas to industrial appliances. There are shown in operation a number of different types of "Metro" furnaces and burners, made by the Company to meet the greatly varied requirements of the manufacturers of South London; and specialists are in attendance to discuss heating problems. In front of the stand are some fine models of furnaces provided with a simple arrangement of drop bottom for cleaning out the slag; while on the walls are a series of excellent photographs of installations of furnaces in the Company's area. There are to be seen several low-pressure furnaces for the melting of soft metal. Representing efficiency of gas for power purposes is a Crossley 4½-HP. gas-engine of quite the latest type; and a feature is made of the up-to-date gas lighting, by means of the "Metro" burners and pneumatic controls. In a separate division are a "Metro" fire of attractive pattern, and a model gas-meter, with the announcement: "Gas-meters in South London are measuring energy supplied (the power of doing work), and not gas volumes only."

Apart from this representative display, there is not a very great deal of special and particular interest to the gas industry, though, of course, the greater number of the exhibits have a more or less direct bearing upon it. The Anglo-American Oil Company, Ltd., have a model service station for the distribution of petroleum products. Armstrong College, Newcastle-on-Tyne, place on view Dr. Bedson's apparatus for determining the liability to explosion of various coal dusts, and the inhibitory power of inert dust. Those desiring striking posters on the subject calculated to arrest the attention of their employees, will find them at the stand of the London "Safety First" Council and the British Industrial "Safety First" Association.

A varied display—mainly on the electrical side—is made by the British Thomson-Houston Company, Ltd., whose plant is well known in gas-works. One of the features is their flow-meter for measuring the flow of liquids and gases in pipes, and checking consumption and leakage. Several of these have been installed in the Birmingham Gas-Works, and one is on order for the South Suburban Gas Company—all for use in connection with steam plants. For whatever purpose they may be required, the general principles of these flow-meters are exactly the same; the instruments differing very slightly in their actual design to suit the physical characteristics of the various agents to which they are applied. It is pointed out that, as there are no delicate working parts or adjustments liable to get out of order, the meters will retain their calibration indefinitely. For indicating and recording, they are completely fitted; and this type of apparatus can be equipped with an accurate integrating attachment, which is designed for the same class of service as the meters. The attachment automatically integrates the values of flow, thereby making it possible to read the total flow for any given period from the dial register.

Messrs. Chance Bros., & Co., Ltd., exhibit a large selection of heat-resisting glass globes, &c.; the Coal Smoke Abatement Society, a large model prepared to scale, to show the volume of soot annually deposited in London (76,000 tons), in comparison with the Clock Tower of the Houses of Parliament; and Messrs. Ewart & Sons, Ltd., have geysers in operation in a variety of design to suit every requirement. For members and for foreign buyers who are desirous of being put in touch with firms who can supply their wants, the Federation of British Industries have an information bureau. Messrs. George Kent, Ltd., make an interesting display of Venturi and other recording meters. Low-Temperature Carbonization, Ltd., draw attention to their system for the production of a solid smokeless fuel, and show the range of products from the coal so treated. The Architectural Decorations Department of the Nautilus Fire Company, Ltd. (who have a place in the exhibition), is already well known to readers of the "JOURNAL." The Sheringham Daylight Shade is to be seen—a device designed for the production of artificial daylight. Messrs. Stothert and Pitt, Ltd., make a feature of "Feuerheerd" rotary liquid pumps, for the manufacture and sale of which they are the sole licensees in the United Kingdom. This type of pump is claimed to be markedly suitable for handling liquids of high viscosity. Cooking stoves are represented by the externally-heated ovens of the Stimex Gas-Stove Company, Ltd., who also show gas water-heating appliances. In connection with steam-raising, there is the patent forced-draught furnace of the Turbine Furnace Company, Ltd.; and engineers generally will have their attention attracted to the "Vislok" safety lock-nut, the uses of which appear to be legion. Both the "Turbine" furnaces and the "Vislok" nuts are to be found in numerous gas-works throughout the country.

It should be mentioned that a series of conferences has been arranged to take place at Olympia during the run of the exhibition. One of these is fixed for to-morrow [Thursday] afternoon, at 2.30. when the subject is to be "Gas." Sir Dugald Clerk, K.B.E., F.R.S., has promised to take the chair; and Mr. F. W. Goodenough will speak.

LOCATING POSITION AND DEPTH OF PIPES.

An instrument for determining, without digging or using a probe, the path which a pipe traverses in the ground, and its depth from the surface, has been devised by Messrs. Stewart Bros., of Ottawa (Ill.). It operates electrically, and is quite simple. A current is sent out over the pipe, and an exploring coil attached to a receiver is used for locating the path of the pipe. An indicator shows when all connections are right. Clamps are used for making good contact on the pipe; and in an example illustrated, one wire from the instrument is attached to the pipe near the meter in the first of a row of houses, and another wire is fixed in a corresponding position in the last house. The service-pipes can be traced to the main; and the main can also be traced between the houses. A tone can be heard in the receiver at any point between the wire and the pipe; whereas directly over the pipe no noise will be heard. This marks the path of the pipe. The depth of the pipe is determined in the following manner: One end of a stick is placed directly over the pipe; the stick being at right angles to the pipe, and extending towards the wire. The stick is then passed through loops at one end of the coil, and the top part of the coil unlatched. By listening in the receiver, and turning the top part of the coil back slowly away from the pipe until the top stops, a pointer will show the depth of the pipe. Where pipes are frozen, any part of the pipe that traverses the ground above the frost-line can be determined.

IS LIGHTING WORTH KEEPING?

Setting himself to answer, in a paper before the Gas Sales Association of New England, his own question, "Is gas lighting worth saving; and, if so, what means shall we take to accomplish it?" Mr. J. Carroll Aaron argued that any customer worth spending money to secure in the past is worth saving for the future. Assuming, he said, that each lighting customer, on the average, is using 10,000 c.ft. of gas yearly, to lose this much revenue is serious enough; but when we consider that our investment in plant, mains, services, and meters remains, the question becomes still more serious. One of the first figures presented by a company in asking for a rate is the amount of money invested balanced against gross and net revenue secured. If the present revenue obtained from lighting be decreased very materially by loss of customers, how can the remaining output bear the entire investment without increasing the rate? One point often lost sight of in this connection is the advantage gained by the electric company in taking a customer from the gas company. The gas company's revenue is decreased, while their investment remains high; whereas the electric company's revenue increases, sometimes without any appreciable increase in investment. With the present price of gas, and the uncertainty of its getting back to the price of the almost forgotten days—at least for some time—what load can the gas man confidently hope to secure to replace his lighting load, should he lose his lighting to the electric company? The electric man is doubly fortified; for, as his night load increases, he hunts around for increased day loads, to keep his plant operating continuously and profitably. Therefore he is in the position of getting former gas-lighting customers for his night load, and then competing with the remaining day gas load used for fuel. He declared he felt sorry for the gas man who says—and some are saying it every day—"Oh, we expect to lose our lighting load." The solution of the problem of renewing the hold on gas-lighting business is to promote the sale of up-to-date lighting appliances, followed up by a system of inspection of present lighting equipment and the placing of it in the best possible condition.

SCOTTISH JUNIOR GAS ASSOCIATION
(WESTERN DISTRICT).

The address of Mr. WILLIAM BENNETT, before the above-named Association on Feb. 5, entitled "Thoughts on the Education and Training of a Gas Engineer" [*ante*, p. 337], gave rise to the following

Discussion.

Mr. S. H. HUNTER began by venturing the opinion that the gas industry had been left to men who themselves had little education. While he in no sense wished to speak disparagingly of those who were their seniors, they did occasionally wonder how certain individuals among them came to occupy the positions they did. Personally, he was inclined to doubt whether a trade union scheme applied to the gas industry would have the effect of lowering the status of the industry, as suggested by the author.

Mr. W. J. LENNOX (Falkirk), while generally reiterating the views expressed by the previous speaker, maintained that nowadays they required men who, to begin with, had been educated up to a certain standard. He never supposed that the author intended that men who were compelled, by force of circumstances, to enter the gas profession somewhat early in life should undergo a long period of training. No doubt in big cities, like Glasgow or Edinburgh, where services of a somewhat outstanding character were demanded, a very lengthened period of training might not only be desirable, but necessary. In small works, however, where they had to produce from 50 to 80 or 90,000 c.ft., they would not require such training. His own view was that success in the profession lay to the hand of the rank and file of outstanding men. So far as improving the standard of knowledge and education was concerned, it had been suggested that an apprentice should have six months in the pattern shop, six months in the foundry, and six months in a variety of other shops. On this point his (the speaker's) view was that an apprentice could not possibly learn much in these periods of six months. As things were, seven years were of no earthly use to some men whose capacity of assimilation was such that twenty-seven years were really necessary. On the other hand, men with intelligence, brains, and push required less training in mechanical engineering to enable them to come to the front. As a fact, some gas engineers, in point of all-round ability, could not be superseded by even the most highly-trained of University men.

Mr. J. M'INTYRE (Glasgow) said he felt he ought to congratulate Mr. Bennett on the ideal scheme he had mapped-out for the training of young men to enter the gas profession. The unfortunate thing was that they could not all have a university training. Assuming, however, that such a training was impossible of attainment, the latter or alternative scheme outlined by the author in his most suggestive paper would be of decided advantage. It was really important for a man in the gas profession to know the general principles of management in a small-sized gas-works. On the general question, he (Mr. M'Intyre) felt bound to say that the time had now arrived when the whole status of the profession should be raised. The time devoted to training at present was in the main too short; and if young men could be persuaded to take up even one or two branches, and devote their study to them, it would help to give them a really good basis to work upon. As to whether the study should be continuous or sectional, he personally thought that was a point which depended more on the circumstances of the individual. There were many instances where, if apprentices got a little teaching in technical training, they would find it something of a change. Such teaching would not lure them from their course of study, but would rather have the tendency to cause them to return to it with renewed interest and a fresher outlook. Very often experience had shown how men of gumption came to the front even though their early training had not been of the best.

A MEMBER at this stage interposed with an interesting point. He called the notice of the meeting to the fact that attention had so far been altogether directed to the scientific side of training, while nothing had been said about salesmanship. No doubt there was a great deal of distinction in being hailed as "a good engineer;" but it must not be forgotten that the good engineer had also to sell his gas. Many men of their acquaintance were not so much engineers as really successful men with a commercial instinct for selling gas, and of course it was the sale of gas that brought in the money. Years of training were necessary for the acquisition of knowledge in the scientific side of the profession; and along with this had to be borne in mind the further fact that the commercial aspect of the business was as important to an engineer as knowing his works.

Mr. M. PATERSON (Wall Street, Glasgow) contended that the paper before them was opportune and valuable for the reason that the teaching of everything in connection with gas engineering and manufacture was haphazard. To a great extent young men entering the profession had to trust to what their superiors could tell them. Very often the hints that were given were not at all satisfactory. A superior might say a particular class was good and should be attended, and that some other class was of no use. Opinions of this kind, based solely on the views of the individual, were not at all satisfactory, and did not make for an improvement in the efficiency standard of those in the gas engineering profession. A demand was being made that the Institution of Gas Engineers should set its house in order. Just because he felt the Institution would not move in this matter, he personally was not in favour of asking them to take it in hand at all. The reality of the position was that the Institution should not be "dragooned" into doing something now—they should have acted long ago, but in reality had done nothing. It would be recalled that at one of their recent meetings Mr. Cubie, their Secretary, read a communication from the English Association of "Juniors" which bore upon setting-up some sort of an examination qualification. The English Juniors, he could see, were pushing the matter with the Institution of Gas Engineers, and trying to induce them to take it in hand. His view, however, was (and he was going to repeat it) that the Institution should be permitted to do nothing of the kind. Speaking as one who had a chemical training, it would be naturally expected that he should like more training on the chemistry side of the question than on the engineering. It seemed to him, however, that a man who looked intelligently around him in a works for a matter of six months ought to be able, to a certain extent, to get to close quarters with any problem that arose in the works. Constructional engineering or the designing of works could be allocated to other outside experts who had made a speciality of this branch of the business. True, in a large number of small works the resources were not such that the owners could afford to pay for gas engineers with an experience in designing. He appreciated this point; but at the same time he really did feel that something ought to be done now to raise salaries so that those contemplating going into the industry would be given some incentive to expend money on their initial training.

Mr. WILLIAM HOGG (Wall Street, Glasgow) said he was willing to concede that up to a point the author was on right lines. Nevertheless, he believed the man with a clear vision, who could grasp a problem with an alert and clear brain and was capable of putting his intuition to the test, was bound in the end to be successful. He was more enamoured of the sound practical man than the mere theorist; and it had always seemed to him that the person who could show conclusively, and from a practical standpoint, how a job was to be done was the one who ought to get it.

Mr. J. S. M'NICOL (Glasgow) was disposed to think the author had put before them a lofty ideal; but he doubted if any man in the course of a lifetime could grasp all the different branches he had enumerated. To his mind, the best place for training a gas engineer was in the gas-works and on the district. The author propounded the theory that with the absorption of science and university education the status of gas engineering would be raised, with the result that increased remuneration would as a matter of course follow to those engaged in the profession. There would be no need, argued Mr. Bennett—given science and university education—to depend on trade unionism at all. He did not subscribe to this theory at all. What, he would ask, about the salaries that were paid to some gas managers at the present time? Why, in many instances the ordinary stoker was being better paid than the gas manager.

Mr. M'GRAW (Dawsholm Works, Glasgow) said he was bound to admit readily enough that it took a great deal of training to enable a man to win through to the top of the tree. At the same time, he thought the practical man, as well as the technical authority, should have a chance of getting at the plums of the profession. In many small works there were men who had the duties of manager, engineer, secretary, stoker, and everything else at their finger tips. Such efficient men as these ought not to be prevented from climbing to the topmost rung of the ladder.

Mr. JOHN FRAZER (Dalmarnock) remarked that Mr. Bennett had set before them a particularly high ideal, which it would be somewhat difficult to attain. For all practical purposes, perhaps it would have been better if the author had outlined a scheme which struck more at the happy medium. Most of them, he imagined, if they were really in earnest, were in pursuit of education. In their work they were pursuing education all the time. He was ready to acknowledge that Mr. Bennett's ideas embraced a system capable of application to large numbers on the other side of the Border. In Scotland they had a very large proportion of small works—proportionately more than England, when regard was paid to the respective sizes of the countries. In Scotland the gas managers of these small works had to know something of everything. He had to be a gasfitter, a tinsmith, an engineer, and a stoker. There was no question but that the training Mr. Bennett had sketched out was an ideal one for those who were possessed both of time and money. He must readily concede that there were certain points in the author's paper with which he (Mr. Frazer) was in most hearty agreement. The time was ripe when they ought to have some particular scheme of training; and, of a certainty, the man Mr. Bennett was aiming at was the man of the future.

Mr. JOHN TAYLOR (Wall Street, Glasgow) volunteered the important suggestion that directors of corporations or companies who were interviewing candidates for posts as managers should have the assistance of a qualified engineer who would help them to sift-out the most gifted men.

Mr. J. CUBIE (John Street, Glasgow), felt that the author's schemes were distinctly elaborate. They were perhaps not too elaborate, however; and if they could be worked out, they would doubtless prove ideal. The author had been bold enough to remark that there was growing recognition in the industry of the fact that the gas engineers of to-day would require to give way to men of the highest training and education, if the industry was to hold its own. This looked like a clean sweep of all the gas engineers in the country. To this claim of the author he would merely reply that the hallmark of the Institution of Gas Engineers did not carry out such a standard of efficiency. Unquestionably the best men were wanted and needed for the profession; but if they were to allocate their youths to two classes—men with money and men without money—then he was opposed to it out and out. His clear conviction was that the man who had studied to make himself efficient was as entitled to as good a job as the other.

Mr. JAMES DICKSON (Kirkintilloch) urged that there should be a general and greater encouragement of juniors.

Mr. BENNETT briefly replied to the discussion. He indicated that the views he had heard proved that something was wrong with training and educational systems. If the outcome of the discussion and the criticism was to discover a system more in sympathy with the mind of the meeting, then he felt that his paper had not been in vain. The idea he had ventilated, of allocating apprentices to various works for six months, was not to make tradesmen of them in these particular lines, but to enable them to obtain a foundation of general principles.

Before the close of the proceedings Mr. Bennett was awarded a cordial vote of thanks.

Mr. Leonard G. Barber, of Cambridge, whose death, at the age of 43, was reported at the January Council meeting of the Institution of Gas Engineers, left estate of the gross value of £3160.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Sutton Amalgamation.

SIR,—I am glad to see in your last issue Mr. Carr's recantation of two serious errors in his report which he attempts to ride-off from as "inadvertency." Unfortunately for him, they both weigh the unjust balance in favour of the policy he advocated rather than impartially judged. But the fallacies he supported with such amazing disregard of the vital principles really and truthfully involved, have *before* his recantation been blown to the winds by Mr. Cash's masterly analysis and exposure. So the repentance is not spontaneous, but prudent. There is an old saying that "Give a lie half-an-hour's start, and you can't overtake it in eternity."

Through some disloyalty, means were afforded for Mr. Bell to communicate his fallacies about the *fusion* being a purchase, and about certain share quotations, to a large number of shareholders whose proxies were obtained without the Directors, as they were advised, having the opportunity of refuting the errors of the opposition.

Twice I spoke to clear-up the facts, and stated that, in the comparisons, two salient facts were suppressed: (1) For the last two years the Sutton repairs have not been made, but *deferred;* and (2) that the gas as made on Mr. Carpenter's system of water gas (enforced, he said, by insufficient purifiers) lowered the quality 12½ p.ct. below the Wandsworth quality.

If the consumers, among whom I have relatives, realized what they are getting through this and the defects of mains (also requiring overhaul), the shareholders would find themselves in real trouble; for there is no Government sanction now. The decision of the Wharncliffe meeting will react on the price of gas to from 9d. to 12d. per 1000 c.ft., and will equally depress the dividend by from 1⅛ to 1½ p.ct. comparing with Wimbledon, as we shall shortly see fully proved.

H. E. JONES.

13, *Queen Anne's Gate, S.W.*,
Feb. 14, 1921.

REGISTER OF PATENTS.

Manufacture of Gas.—No. 156,812.

HELPS, G., of Nuneaton.

No. 14,750; May 17, 1919.

The main general objects of this invention, in the words of the specification, are to completely gasify fuel in such a way that the resultant gas shall contain as high a proportion of the heat units of the original fuel compatible with the inevitable losses due to radiation during the process, and with as little inert gases in the product as possible. Any commercially sound complete gasification presupposes low-grade gas, and inerts are inevitably present in larger quantities than desirable.

I have already shown in patent No. 111,495 that even nitrogen is not always a disadvantage, because a high-grade gas diluted with nitrogen may give a better duty than high-grade gas without it. The effect of nitrogen in flames has not so far been thoroughly investigated; but it is quite safe to say that where nitrogen enables the proper proportion of air to be admitted to the burner tube, through the power it exerts in injecting the necessary primary air, better results are obtained than when such power in the gas at the nipple of an atmospheric burner is wanting. The presence of nitrogen in the gas not only reduces the air required, but it has the same injective power as the other air-requiring constituents of the gas.

The plant to which this invention relates being simple, self-contained, and cheap, lends itself to the gasification of coals and the like of the poorest order, and which may have a considerable proportion of inert matter. The losses from radiation when using such plant should not exceed 15 p.ct., which would give 85 p.ct. of the heat units of the coal in the gas.

In the ordinary gas-works practice, coal is carbonized in a retort or coke-oven, or the like, by the application alone of outside heating; and in this way the process takes a comparatively long time, and something like 336 lbs. of coke are used to carbonize 1 ton of coal. I am aware however, that processes have been proposed in which the coal has been carbonized by the internal application of hot gases. In the modification referred to, the gas produced when the process is carried out so as to avoid the introduction of producer gas or air, or the products of combustion from the setting, amounts to about 10,000 c.ft. of gas of 600 B.Th.U. net (a total of 6,000,000 B.Th.U.), and the expenditure of coke in the producer will have been about equal to 4,750,000 B.Th.U. The weight of 10,000 c.ft. of 600 B.Th.U. gas will be about 3 cwt.; so that (roundly) the process may be said to entail an expenditure of 6 cwt. of coal to get 3 cwt. of gas.

The process therefore cannot be said to be satisfactory. If such a high-grade gas were really necessary, there might be some reason for such a process; but as I have already pointed out, after it is made, high-grade gas is difficult and costly to consume perfectly—due to the air-gas ratio and the type of appliance used; and in practice the potential heating value of such a gas is largely wasted.

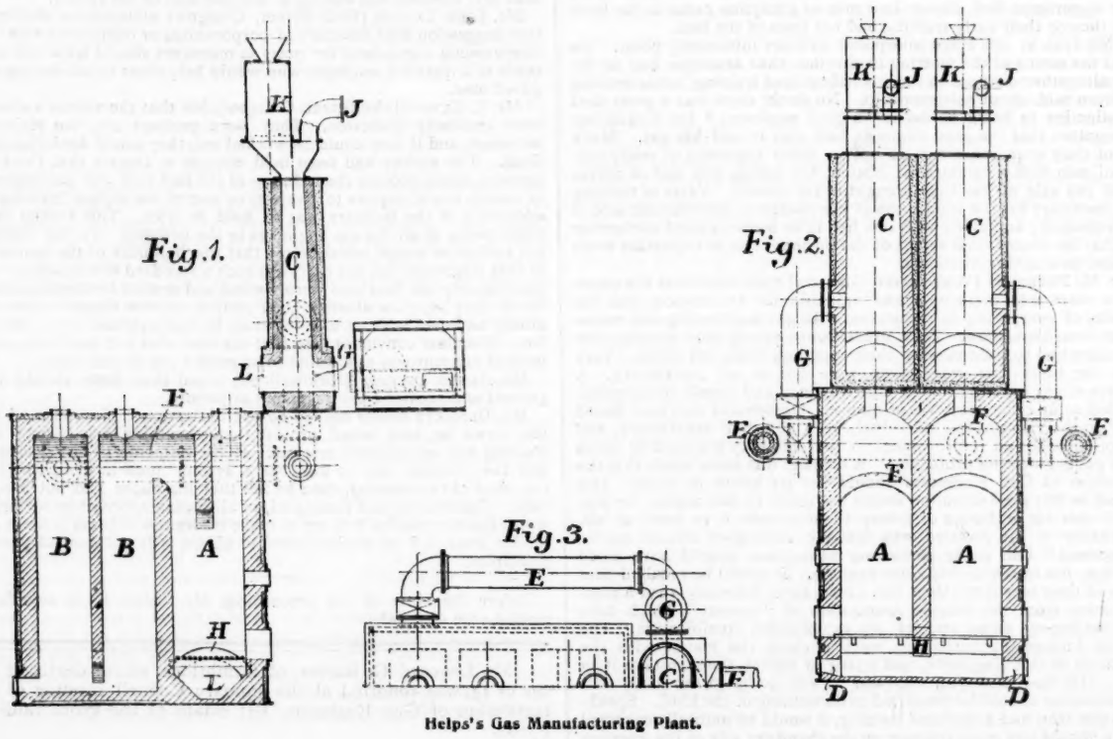
When coal or coke is burnt, both are mainly transformed into CO or CO_2 by the admission of air; but as the oxygen necessary for this conversion is obtained from the atmosphere, for every volume of it 4 volumes of nitrogen are admitted, which as they pass through the zone of combustion absorb heat. Hence, although the products of combustion may contain all the heat units the coal contained (if radiation losses, &c., be ignored) the average temperature of the bye-products is much lower than would be the case were the nitrogen not present.

When it is possible to use the sensible heat in the producer gas to carbonize coal or generate steam, or do other required work, the heat losses would be reduced in the proportion of the sensible heat utilized.

There will be no difficulty in working when the heat required to carbonize the coal is contained in the blue superheated water gas made; but if the superheated water gas does not contain sufficient heat for the purpose, such heat may be augmented by any or either of the following means separately or in combination: (1) The combustion of blue water gas or a mixed gas externally to the carbonizing retort; (2) the sensible heat in the blows, by leading blow gases into the carbonizing retort or applied outside the retort; (3) the sensible heat in producer gas, by leading producer gas into the carbonizing retort or applied outside the retort; (4) the combustion of producer gas externally to the carbonizing retort; (5) high-pressure or superheated steam applied outside the retort.

The effect of using hot superheated water gas for the carbonizing process is to give a better quality of gas. When the sensible heat of producer gas or the heat of the combustion of producer gas is used, the quality of gas made is reduced.

Plant for carrying out a process of this type comprises, according to this invention, a generator, a vertical retort separate from the generator, whose outlet is above the generator and in proximity thereto,



Helps's Gas Manufacturing Plant.

and controllable means for admitting gases from the generator into the retort.

Preferably, the generator element comprises in one structure a fuel chamber and a superheater, while the retort is ⊥ shaped—the base of the ⊥ being directly above an inlet into the fuel chamber of the generator.

Fig. 1 shows in vertical section a twin generator set contained in the rectangular casing with retorts or carbonizers together with connections. Fig. 2 is a cross vertical section of the set. Fig. 3 is a plan of same.

A is the generator; B, the superheaters adjoining; and C a carbonizer or retort. The air-blast passes into the generators and forward—down through the first superheater and up through the second superheater B—and thence through the mains E and F to a boiler generating the steam employed. Steam is then introduced in one superheater at the top and, passing through the chequerwork it contains, reaches the generator. It travels through this in a downward direction under the arch H dividing the generators and up through the second generator; then on through the other pair of superheaters into the mains E and G, which lead to the carbonizers or retorts. Here the blue gas becomes mixed with the coal gas it evolves from the coal in the retort, and goes forward through the pipe J to the collecting main, and so on through the washing and purifying plant to the holder. The coal enters the retort through the feeding hopper K; and, as it is converted into coke, it is discharged through openings L in the lower portion of it and fed hot into the generator, or quenched and removed for sale.

The plant may be used for the manufacture of blue water gas.

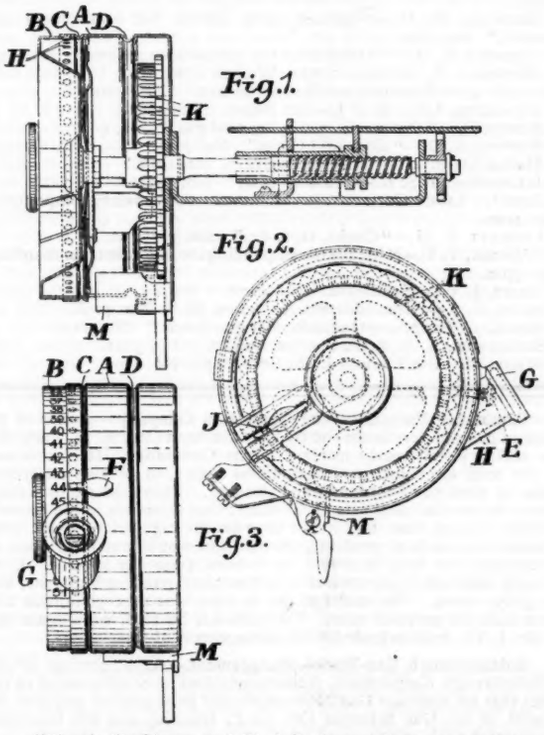
When the vessel A is used for making producer gas or semi-water gas, the producer gas may enter the retort C through the pipes E and G or pass through the pipes F for any desired purpose.

Prepayment Gas-Meter Mechanism.—No. 156,843.

WILSON, J., and PARKINSON and W. & B. COWAN, of Fitzalan Street, Kennington.

No. 19,180; Aug. 2, 1919.

This invention relates to prepayment gas-meter mechanism in which the casing enclosing part of it has two peripheral ridges formed in the wall, preferably by spinning, which serve respectively as a seating for the flanged cover and as a guard ring which prevents a smaller coin than that for which the slot is intended from rolling forward into engagement with the measuring wheel teeth when introduced into the coin-pocket while the latter occupies a position below the horizontal plane through the measuring wheel axis.



Wilson's (Parkinson and W. & B. Cowan) Prepayment Meter Mechanism.

Fig. 1 is a vertical sectional view of one form of construction of meter; fig. 2 a front elevation; fig. 3 a side elevation.

As indicated, the prepayment mechanism is contained in a circular casing A (provided with a flanged cover B) of thin metal pressed from a circular blank to form a cup. In the walls are two internal peripheral ridges C D, one of which is deeper than the other, and adapted to prevent under certain conditions (say) a halfpenny from engaging with the teeth of the measuring wheel where the mechanism is intended for use with pennies. The ridge is so positioned as to form a base upon which the cover provided with the coin slot J may rest during adjustment.

To provide for ready adjustment of the cover, it is furnished with a series of perforations H which lie behind the walls of the casing when the cover is in position; while a screw E is provided in the casing which is adapted to enter any of these perforations.

The casing is also provided with a pointer F in connection with the dial; and the screw referred to above enters the casing through a cup G in which a seal may be placed to expose efforts at interference by unauthorized persons.

On the outer edge of the cover flange is a series of markings all of which correspond to their respective perforations H, and indicate the quantity of gas obtainable in exchange for the coin for which the mechanism is intended. By this construction the cover can readily be set, and the dial can always quickly be rendered legible by cleaning.

To set the meter to give the desired quantity of gas per coin, the cover with its flange is revolved until the number on the latter which represents the number of cubic feet of gas to be obtained per coin comes directly opposite the pointer. This carries the coin slot to a definite position, and a stop [not shown] which projects behind the cover limits the angle through which the coin pocket can be turned before it is arrested by the coin pocket discharge stop M. The seal cup screw is screwed home, entering one of the perforations in the cover flange and securing the cover in position. Thus the angle through which the measuring wheel is turned through the intermediary of each coin is dependent upon the limits imposed: (1) By the projection mentioned above (itself dependent upon the position of the flange cover), and (2) by the fixed coin pocket discharge stop M. A slot [not shown] is provided in the casing just to the right of the stop M, through which slot the coin falls by gravity from the coin pocket when the latter is arrested by this stop.

Now when the coin slot occupies a position below the horizontal plane through the longitudinal axis of the mechanism (such as is indicated in fig. 2) a coin smaller than that for which the mechanism is adapted will be prevented from passing forward into contact with the teeth K by the ridge D, whereas a coin of correct size may be caused to engage the teeth and afford connection between them and the coin pocket.

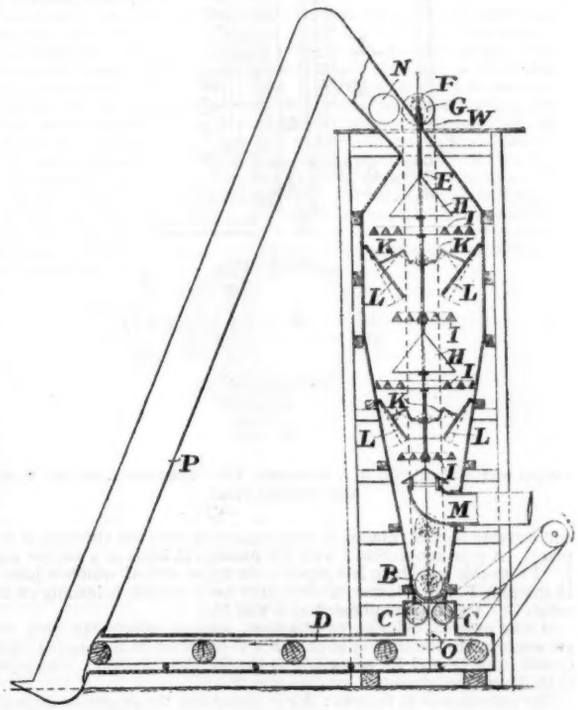
Means for Drying Salts.—No. 156,963.

SOUTH METROPOLITAN GAS COMPANY, and PARRISH, P., of Blackheath, S.E.

No. 28,278: Nov. 14, 1919.

The patentees point out that the success of the operation of drying a powdered substance by causing it to fall in a shower down a tower in which it meets a current of hot gases, depends mainly on the efficient distribution of the falling material. When the operation is applied to the drying of salts so as to obtain them in fine-grained form, it is necessary to prevent the crystals from adhering together as they dry; so that the distributing devices must have also a certain degree of pulverizing action.

By their present invention the falling salt is distributed in stages by being received on cones placed at different levels in the tower with interposed baffle-bars, preferably of triangular section. The repeated impacts of the salt in descending the tower ensure a discrete condition of the crystals.



Parrish's (South Metropolitan Gas Company) Sulphate Dryer.

The illustration shows a metal tower A of rectangular section in plan. At its lower part it is tapered to form a trough for a screw conveyor B which carries the salt through an opening, substantially sealed by the salt, and discharges the salt to the crushing rolls C, which break up any remaining lumps and allow the salt to fall on to the conveyor D. Mounted to slide in a bearing at the summit of a tower is a rod E having a stirrup F subject to the action of a cam G. This rod carries two metal cones H and four grids I consisting of wooden bars of

triangular cross section placed at right angles to each other. One of the cones is above the first grid, while the other is between the second and third grids. Between the first and second grids, and again between the third and fourth grids, the rod engages a system of levers K, whereby two double flaps L, hinged to the sides of the tower so as to form the four sides of a hopper, are lowered and raised as the rod E is raised by the cam G and then allowed to fall.

The salt is charged at the top of the tower so as to fall on the first cone, which distributes it over the first grid, through which it falls on to the flaps L, to be delivered to the second grid. The latter distributes it over the second cone, and so on. During its descent in this distributed condition, the salt meets a current of hot air introduced through the pipe M and escaping through the pipe N.

The cam may be continuously driven; but this is not generally necessary, since periodic concussions of the cones, grids, and flaps usually suffice to prevent accumulation of adhering salt. In the arrangement shown, it is assumed that the shaft of the cam is rotated when necessary by a hand-crank on a shaft O at the ground level—the two shafts being geared together by a belt or chain W.

The salt discharged from conveyor D may be received by another conveyor (not shown) for transport to store, or may be diverted into the elevator P to be returned to the tower for second treatment.

It is said to be advantageous that the cones and flaps should be perforated so as to enable a certain amount of sifting to occur within the tower and to facilitate contact of the salt with the hot air.

Combined Coal Carbonization and Gas-Making Plant.—No. 157,036.

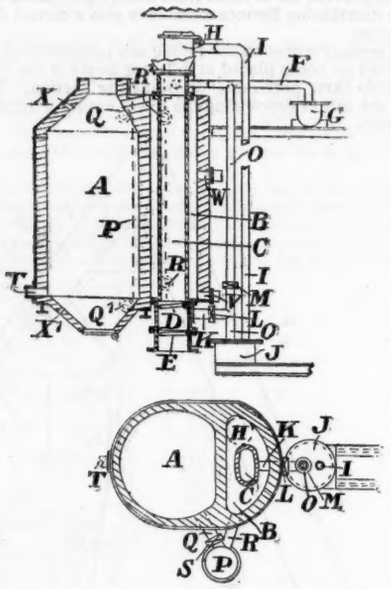
R. & J. DEMPSTER, LTD., KNIGHT, H. S., and SIDDALL, F. J., of Manchester.

No. 18,076; July 2, 1920.

One form of the invention is illustrated in sectional elevation, and sectional plan.

A is a chamber provided with coke for the generation of producer and water gases therein, and B (a second chamber adjacent to or integral with the former) contains a vertical retort C built-up in sections, tapered if desired, and of any suitable shape in cross section. It could be subdivided into a series of chambers containing retorts. The retort C is provided with bottom doors D and E; or it may have automatic or other means of discharge. At the upper end, the retort is connected by the pipe F to a hydraulic main G.

The chamber B is also provided with an outlet passage H—the upper



Knight and Siddall's (R. & J. Dempster, Ltd.) Combined Coal and Water Gas Making Plant.

end capable of being placed in communication with the chimney of the plant. A pipe connection I with the passage H leads to a washer seal J. From this seal there is a pipe O, the upper end of which is joined to the pipe F, and a lower part of which has a branch K leading to the retort C. Valves are indicated at L and M.

P is an external cylinder or chamber, through which gas from the generator passes on its way to chamber B by means of connecting pipes Q and R, or Q^1 and R^1, according to the direction desired. The pipes Q to R^1 are under control by the valve S.

The operation is as follows: Air is blown into the generator through inlet T, and after passing through the heated coke the blow-gases pass out through the pipe Q into the cylinder P; and thence they pass by means of a pipe R into the chamber B, wherein they are burned as they work upwards through the checkerwork in the chamber. The products pass away into the chimney, the upper valve shown being opened for the purpose. The blow-gases are burned in the chamber B by means of primary and secondary air, preferably injected under pressure through the inlets V and W.

By the means described, the coal or fuel is partially carbonized; but to carry the process further in the initial stages, steam may be injected into the producer at X^1, but in some cases it could be injected above the fuel bed, as at X, the direction being determined by the desirability of up or down make. The resulting water gas after passing through the cylinder P is burned in the chamber B in similar manner to the case of the blow-gases. At the end of this operation, and after a further blow through the generator, water gas for storage or for use is made by the injection of further steam; and the resulting water gas, after passing through the chamber B, and imparting heat thereto, passes into the pipe I—valve H^1 being closed, and valve L opened. That is, it passes down into the seal J and thence into the retort C, by means of the pipe K. Or the gas may be diverted to the pipe F along the connecting pipe O, by opening the valve M and closing the valve L.

Thus the distillation of coal in the retorts is carried out continuously, quite apart from the question of whether producer gas or water gas is being made.

Coke-Quenching Device.—No. 157,042.

FRÄNKEL, A., of Berlin.

No. 25,173; Sept. 1, 1920.

The patentee's specification points out that, in the usual coke-quenching plant, the incandescent coke is ejected from the oven into a trough and is quenched therein. As the walls of the quenching receptacle become worn quickly by the fall of the masses of coke, by the heat of the incandescent coke, and finally by the quenching water, attempts have been made to protect the receptacle by means of double bottoms, inserted members, or the like, which also are provided with openings for the passage of the cooling water. These attempts have led to no useful result.

The object of the present invention is to provide a coke-quenching receptacle which is protected from wear, and which consequently has a longer life than the usual troughs—its essential features being that on the inner sides of the walls are arranged, after the manner of a grate, flat iron bars, preferably interchangeable. The separate bars are in consequence little damaged and stand longer, and, in addition, are able to expand and contract due to temperature changes without affecting each other or the receptacle.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Feb. 9.]

Nos. 3611 to 4307.

BACHNER, A.—"Gas-burners." No. 4211.
BEARD, G. F. H.—"Telescopic gasholders." No. 4272.
BROUGHTON, V. W. DELVES-.—"Gas-cookers and gas-fires." No. 3858.
BROWNE, H. M.—"Coin-changing device for prepayment slot-meters." No. 3801.
BUDGELL, S. H.—"Attachment for gas cooking-ranges." No. 3963.
CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE COMPANY, LTD.—"Fire-bars and furnace-grates." No. 4201.
DEMPSTER, LTD., R. & J.—See Beard. No. 4272.
FABRY, R.—"Process for purifying coal gas." No. 4007.
FEWINS, A. G.—"Cock and valve." No. 4054.
HAUSERMANN, S.—"Gas-kitcheners." No. 4013.
ILLINGWORTH, S. R.—"Coking coal." No. 3923.
LINDSAY LIGHT COMPANY.—"Manufacture of thorium compounds." No. 4100.
LUCKETT, F. H.—"Cocks, taps, &c." No. 3635.
O'BRIEN, T. B.—"Means for suspending incandescent gas-mantles." No. 3702.
SCOTT, J. W.—See Beard. No. 4272.
SHAW, E. J.—"Incandescent gas-lamps, &c." No. 4056.
SNELL, C. SCOTT-.—"Incandescent gas-lamps." No. 4186.
STREDWICK, E. S. & W. S.—See Browne. No. 3801.
WADE, H.—See Lindsay Light Company. No. 4100.

Cambridge University and Town Gas Company.—A rise in the price of gas was foreshadowed by the Chairman (Mr. E. H. Parker) at the ordinary half-yearly meeting of the Company. He also hinted at the need for a further large capital outlay, to provide additional plant to meet the ever-increasing demand. They had made enough money to pay the usual rate of dividend; but reference to the revenue account showed that, had it not been for the high prices which were obtained for residual products, the position would not have been so satisfactory—in fact, it would have been quite the reverse. Coke actually realized £6209 more than in the corresponding half year, and tar £3654 more. The make of gas in 1920 was over 38 million c.ft. more than the previous year. Their thanks, he said, were again due to Mr. J. W. Auchterlonie for his management of their affairs.

Middlesbrough Gas-Works Management.—At a meeting of the Middlesbrough Corporation, recommendations were considered to the effect that an Assistant Gas Manager should be appointed and that the salaries of the Gas Manager (Mr. C. F. Blincoe) and the Electrical Engineer should be increased by £100. It was stated that the Gas Manager had £700 per annum. Mr. J. Devine moved that the minute be referred back. He said the Manager was appointed in October, 1916, at a salary of £350, which in four years had risen to £700. The Electrical Engineer was appointed in November, 1915, at £300; and his present salary was £650. Mr. Sadler remarked that both officials would receive better salaries if they were in private employment. They were miserably underpaid. Alderman Calvert pointed out that Middlesbrough sold electricity cheaper than any other town in the kingdom; and they supplied gas proportionately cheaply. The two officials had saved the public large sums of money. The management cost of gas, on a basis of 1000 c.ft., in 1914 was 0·64d., and in 1920 0·3d. The cost was now less than half what it was in 1914. There were thirteen votes for the amendment and nineteen against. A further amendment moved by Mr. Spence, that the question of appointing an Assistant Gas Manager should be referred back, was, however, carried.

MISCELLANEOUS NEWS.

THE CARBON MONOXIDE COMMITTEE.

FIRST DAY.

Evidence Tendered before the Board of Trade Committee.

The Committee appointed by the Board of Trade under section 2 (4) of the Gas Regulation Act, 1920, to inquire whether it is necessary or desirable to prescribe any limitation in the proportion of carbon monoxide which may be supplied in gas used for domestic purposes, held its first sitting on Thursday last, Feb. 10. The Committee is composed as follows: Sir WILLIAM PEARCE, M.P. (Chairman), Dr. T. CARNWATH, D.S.O., M.B., Mr. WILLIAM DOIG GIBB, O.B.E., and Dr. T. GRAY. All the members of the Committee were present at the sittings on Thursday, which occupied both the morning and afternoon. In the morning, Dr. J. S. Haldane, F.R.S., gave evidence at the request of the Committee; and in the afternoon three witnesses from the National Gas Council were heard. The proceedings have been thrown open to the Press; and we are able to give a full account of the evidence and cross-examination of the witnesses by the members of the Committee.

Dr. J. S. HALDANE, F.R.S.

Witness said he gave evidence before the Water Gas Committee which sat in 1899; and, in reply to the Chairman as to the respects in which he thought the position had changed since then, he said that the poisonous action of lighting gas was entirely due to the carbon monoxide contained in it. The lowest proportion of carbon monoxide which would, in time, produce slight symptoms—such as headache and nausea—was about 0·02 p.ct., corresponding to about 0·3 p.ct. of pure coal gas or 0·05 p.ct. of blue water gas. The lowest proportion which would endanger life within about twelve hours was not definitely known, but probably about 0·15 p.ct. (or 2·1 p.ct. of pure coal gas or 0·4 p.ct. of blue water gas) would suffice in some persons, though perhaps 0·3 p.ct. would usually be needed. A good deal depended upon the time of exposure, and the number of hours a person was unconscious. In his evidence before the Water Gas Committee, he somewhat under-estimated the poisonous action of carbon monoxide. The figures he then gave were based on experiments which had been carried-out by Dr. Lorrain Smith and himself at Oxford. These were careful experiments upon themselves, by gradually pushing-up the dose of carbon monoxide day after day. It was found that 0·06 p.ct. could be endured almost indefinitely without any symptoms being produced. When these experiments were repeated two or three years later, however, he found 0·06 p.ct. was a great deal too much. He felt very bad after this quantity for several hours; and subsequent investigations showed that during the earlier experiments he had gradually acclimatized himself to an increasing percentage, much in the same way that people gradually acclimatized themselves to high altitudes. The experiments in question were made with specially prepared mixtures in a room without any ventilation; and it was by acclimatizing himself in this way that he had been able to stand a good deal more than he found was subsequently the case when going straight into a mixture containing 0·06 p.ct. of carbon monoxide.

In Appendix 1 to the Water Gas Committee's report, he summarized the then existing statistical evidence as to the dangers of poisoning by lighting gas and the manner in which cases of poisoning had occurred. This evidence seemed to show very clearly that when pure coal gas was distributed, the risk of poisoning was extremely small—in fact, almost negligible; but the American statistics, and, so far as they went, the very limited British statistics, showed that where carburetted water gas, containing about four times as much carbon monoxide as coal gas, was distributed, the risk of accidental poisoning was about sixty times as great, and thus became quite considerable. In addition, there were numerous cases of suicide and murder with carburetted water gas. Carburetted water gas, however, was becoming a thing of the past, and the mixture now mostly used was blue water gas. The reason for the carburation was to give the gas illuminating power, because it was consumed in flat-flame burners in 1899; but that need ceased to exist with the introduction of mantle-burners. The fact that under the new Gas Regulation Act gas was to be charged for on the basis of its thermal properties, was another reason why the Committee could take it that carburetted water gas would give way to blue water gas. There was a higher percentage of carbon monoxide with blue water gas—say, 42 p.ct.—than with carburetted water gas, which contained about 25 or 30 p.ct. But nobody suggested sending out a straight blue water gas.

Dr. GRAY suggested that it was hardly a fair way to put it, to say that the risk of accidental poisoning with carburetted water gas was sixty times as great as with coal gas. Would it not have been better to express the accidents that had occurred in terms of so many accidents per thousand of the population.

Dr. HALDANE said the reason he had expressed it this way was because the risk of poisoning with coal gas was extremely small; and perhaps if he said the risk with carburetted water gas in comparison was considerable, it would serve the purpose. With blue water gas his comparison would be strengthened, because of the larger percentage of carbon monoxide in it. But, again, nobody had suggested distributing straight blue water gas. With a mixture of coal gas and carburetted water gas or blue water gas the risk depended on the percentage of the other gas mixed with the coal gas. With an addition of 30 p.ct. of either to coal gas, the admixture of coal gas and blue water gas would be much more dangerous than the admixture of coal gas and carburetted water gas.

Mr. DOIG GIBB asked under what conditions Dr. Haldane thought poisoning was likely to occur.

Dr. HALDANE said the analysis of the American statistics showed that by far the greater number of deaths were due to the gas being accidentally left on in bedrooms. In a way, the penny-in-the-slot meter was a safeguard, because the amount of gas which could escape was limited.

Mr. DOIG GIBB, in reply to the remark by Dr. Haldane that nobody proposed to distribute blue water gas, said that the Gas Regulation Act did not prevent anyone declaring such a gas.

The CHAIRMAN said it was this point which the Committee had to consider, because unless the percentage of carbon monoxide was limited, blue water gas might be distributed to the extent of 100 p.ct. On this assumption, would the quantity of carbon monoxide be such that the danger was not serious in the event of a tap being left on when using a penny-in-the-slot meter? He understood that the amount of gas now obtained for a penny was 14 or 15 c.ft.

In reply to Dr. CARNWATH, witness stated that the risk from carbon monoxide increased more than directly as the percentage. He had tried a great many experiments, but had found it practically impossible to get a poisonous atmosphere with coal gas. When the proportion of carbon monoxide was raised from 0·07 to 0·22 p.ct., however, it was found that the risk of poisoning was in a greater proportion.

Discussing with Mr. DOIG GIBB the accident statistics given to the Committee on Water Gas in 1899, Dr. Haldane said that there were still many accidents with gas, notwithstanding that people had been taught how to use it more properly than was the case in 1899.

Mr. DOIG GIBB said he gathered that the number of accidents had been falling very rapidly since then.

Dr. HALDANE said there were numerous cases of suicide and murder with carburetted water gas. The great majority of the cases were due to gas being left on in bedrooms, though cases due to other causes—such as leaky street mains, fittings, &c.—were much increased by the use of carburetted water gas. An appendix to the Water Gas Committee's report gave the result of a number of experiments in different rooms in which gas had been left on from burners or open pipes; and these showed that, whereas it was almost impossible to get a poisonous atmosphere at sleeping level with pure coal gas, it was quite easy with carburetted water gas. Even when a burner was removed, so as to permit a maximum escape, he could not obtain a poisonous percentage of coal gas at the sleeping level, though the air was both poisonous and explosive at the ceiling level. At the time of the water gas inquiry, flat-flame burners were in general use; and he agreed that the introduction of mantle-burners had very considerably reduced the risk of carbon monoxide poisoning in bedrooms. Thus, though there were still a number of flat-flame burners in use, he held the opinion that if it was necessary to send out a gas which could not, in the interests of safety, be used in such burners, then flat-flame burners would have to go out of use altogether. The ventilation in a room had a marked effect on the possibility of carbon monoxide poisoning; and there were few rooms in which the ventilation was not such that the air was changed at least once in two hours. There was also the added effect, in this respect, of the porosity of the plaster walls. His own experiments had been carried out in a room with walls which were not porous.

Mr. DOIG GIBB suggested that the Committee might borrow some of the types of lamps in use in 1899, and those in use now, in order to appreciate the very great improvement that had been made in regard to preventing leakage.

Referring to geysers, Dr. Haldane said that the more reputable gas companies now refused to fit geysers which had not a flue, because it was a monstrous thing to fit a geyser without a flue. Reverting to the question of danger from burners, witness said that with a flat-flame burner, the rate at which gas might easily escape when it was left turned-on but not lighted was more than twice the rate for which the burner was designed. Thus a No. 4 Bray burner would let 9 c.ft. or more per hour escape. With mantles, the flow of gas was much less in similar circumstances. With a commonly-used large size of inverted mantle burner the flow from an unlit burner was not more than 4 c.ft. per hour. The following table showed the maximum percentages of carbon monoxide which he judged, from his experiments, would be at all likely to be produced owing to escapes of gas of good quality from such a burner in rooms of different sizes, with different percentages of carbon monoxide in the escaping gas.

Size of Room.	Maximum Final Percentage of Carbon Monoxide in the Air with Gas containing						
	5 P.Ct. Carbon Monoxide.	10 P.Ct. Carbon Monoxide.	15 P.Ct. Carbon Monoxide.	20 P.Ct. Carbon Monoxide.	25 P.Ct. Carbon Monoxide.	30 P.Ct. Carbon Monoxide.	40 P.Ct. Carbon Monoxide.
500 c.ft.	·07	·14	·22	·27	·33	·39	·52
1000 ,,	·05	·09	·13	·18	·22	·27	·36
1500 ,,	·03	·07	·10	·13	·16	·20	·27
2000 ,,	·025	·05	·08	·10	·13	·16	·21
3000 ,,	·02	·04	·06	·08	·10	·12	·16

The chances of getting less carbon monoxide than was shown in the table, continued Dr. Haldane, was very great, according to the climatic conditions, such as a good wind blowing through the walls. Any percentage above 0·15, as shown in the table, began to get dangerous, especially under long exposure, as happened at night in bedrooms. With the burners adjusted for gas of low calorific value, the percentage of carbon monoxide in the air would be correspondingly higher. Other things being equal, however, it might be said that with mantles the danger of poisoning from an escape from a single burner was much less than with the primitive flat-flame burner, though not much less than with the improved flat-flame burner brought into general use after the Water Gas Committee's inquiry. These latter burners were so constructed that, with the prevailing pressure, they did not pass more gas than gave the maximum lighting efficiency. A No. 4 Bray burner, for instance, did not pass more than 4 c.ft. per hour with the gas unlighted, against 9 or 10 c.ft. with the old-fashioned flat-flame burner. The introduction of mantles, however, had not diminished the risk from other kinds of escapes besides those from a single burner; and these risks increased very rapidly with the increase

in the percentage of carbon monoxide in the gas. Whereas with ordinary coal gas it was very difficult to produce a poisonous atmosphere, this was not so when the gas contained, say, 20 p.ct. of carbon monoxide.

Dr. CARNWATH asked if Dr. Haldane thought the table of figures he had given could be accepted as a basis for arriving at what might be regarded as a reasonable compromise, as to the limitation, if any.

Dr. HALDANE said he had rather hoped the Committee would have time to carry out some experiments of the same kind, in a larger variety of rooms, because there was not a very great number of rooms used in carrying out the experiments he had been able to undertake. He would also like experiments made with modern mantle burners, because his experiments were all with old flat-flame burners.

Dr. CARNWATH said it seemed to him that if the Committee were to fix a maximum percentage of carbon monoxide, it would need some data to arrive at a conclusion.

Dr. HALDANE agreed that it would be desirable to have the most complete data.

Dr. CARNWATH: In your table, you give a figure of 0·14 p.ct. in a room of 500 c.ft. capacity. Would you be disposed to suggest that no gas-burner should be allowed in a room of this size?

Dr. HALDANE: No, because you could get a splendid light in a room of this size with a small mantle burner, which would not allow more than 2 c.ft. of gas per hour to escape.

Continuing, Dr. Haldane said he would have some regard to the use of the room—viz., whether it was a bedroom or not. In fact, he was speaking of bedrooms in this connection, because it was in bedrooms that most of the accidents took place. They did not occur in other rooms, unless it was in bathrooms where geysers were fitted without flues. A factor in the matter was that there should be some control over the types of fittings put into these small rooms. As things were at present, people could put in any unsuitable fittings. Many of the accidents would not happen if skilled people had control over the fittings.

Dr. GRAY pointed out that Dr. Haldane's experiments were carried out in a room not inhabited; and therefore the effect of convection currents, due to people sleeping in the rooms, might make the figures very much worse.

Dr. HALDANE said it would not make them much worse.

Mr. DOIG GIBB asked if it was quite fair to bring in records of suicides by gas. Surely people who were determined to take their lives would do so in any event; and they did it by gas because it was a convenient method.

Dr. HALDANE admitted there was something in that; but he did not think convenient methods of committing suicide should be left about. We put restrictions on poisons, and parapets on bridges, and generally, on the whole, guarded against suicide.

The CHAIRMAN: How far do these figures of yours hold the field?

Dr. HALDANE thought they had been common knowledge to most people interested, and they had not been questioned, so far as he was aware. At the same time, the matter had not come up in an acute form in this country for the reason that nothing was done as the result of the report of the Water Gas Committee.

The CHAIRMAN: But it is a matter of great scientific interest to the industry itself; and I should have imagined that as these figures have not been challenged they could be regarded as holding the field.

In the course of further discussion on this point,

The CHAIRMAN said it seemed to him that it would be extremely difficult to get the figures checked; and it would be interesting to know if the industry accepted them.

Dr. HALDANE remarked that there had been a lot of experience since the figures were given to the Committee in 1899.

The CHAIRMAN said he was anxious not to delay the work of the Committee; and if the figures were not seriously attacked, they would be a factor, although not a dominant factor.

Dr. HALDANE replied that the figures were the results on the tests in particular rooms; and if they were repeated to-day under the same conditions, similar results would be obtained.

Passing on to the question of the desirability of limiting the percentage of carbon monoxide in lighting gas, Dr. Haldane said it was extremely difficult to balance economic advantage against risk to life, though he thought that if the enormous advantages of a convenient source of light, heat, and power could not be obtained without a certain small risk to life, then the public would take the risk without hesitation. He doubted, however, whether the public would be ready to take the considerably increased risks from a high percentage of carbon monoxide in gas supplied for domestic purposes, when there was the practical alternative of obtaining ordinary coal gas (which was extremely safe and efficient) or an electric supply. If the public would not use the more poisonous gas freely for domestic purposes, any economic advantages which it might seem to possess would be quite illusory. Moreover, if lighting gas got a bad name through somewhat frequent occurrence of poisoning when high percentages of carbon monoxide were used, the whole industry might be injured. For these reasons he was inclined to think it would be wise to specify a definite maximum for the percentage of carbon monoxide in lighting gas for domestic use. Considering that the risks of escape from one burner were considerably less than when the water gas enquiry was held, he thought a reasonable maximum would probably be about 20 p.ct. This would have the practical effect of ensuring a lower percentage under all ordinary conditions. The Committee, however, would doubtless be guided by the statistics of poisoning during recent years, and particularly by British and American statistics for towns in which gas containing various known percentages of carbon monoxide was distributed. He hoped, also, that the Committee might be able to institute further and more searching experiments, to supplement those carried out for the Water Gas Committee.

The CHAIRMAN: These are rather important conclusions; for you put it that it is a matter of serious consideration for the gas companies that a high percentage of carbon monoxide might injure the industry by putting the public against this kind of gas.

Dr. HALDANE: I put it in the interests of the public and also of the gas companies.

In reply to further questions by the Chairman,

Dr. HALDANE said that if 20 p.ct. of carbon monoxide was fixed, it would allow one-third blue water gas to be used. If carburetted in the old way, 50 p.ct. could be used—in other words, 20 p.ct. of carbon monoxide would allow of the mixture of 30 p.ct. of blue water gas or from 45 to 50 p.ct. of carburetted water gas.

Dr. CARNWATH said he supposed the 20 p.ct. would be subject to reasonable precautions. Would Dr. Haldane suggest a lower figure in the absence of such precautions?

Dr. HALDANE replied that if the distribution of gas had been left where it was twenty years ago, he should have suggested 12 p.ct. of carbon monoxide. The considerations as regards distribution were now considerably better than they were.

Dr. CARNWATH pointed out that in 1897 there were 22 deaths from coal gas poisoning, while in 1919 there were, according to the Registrar-General's figures, 83 deaths from the same cause.

Dr. HALDANE said that the consumption of gas had increased enormously during this period, although even allowing for that the 1919 figures were a big increase. At the same time, he believed that the figures for 1919 would be found to be a good deal above the average for the preceding five years.

Dr. CARNWATH said the figures he had given for 1919 were distinct from the suicides in that year, which numbered 213.

Mr. DOIG GIBB remarked that the South Metropolitan Gas Company had never had a cubic foot of water gas in their mains, and used a straight coal gas; yet there were occasional deaths from gas poisoning in their area. He asked Dr. Haldane his views as to whether it would be possible, in the same district, to have one supply of pure coal gas for domestic purposes, and a poorer quality of gas for other purposes.

Dr. HALDANE agreed that this would be impossible, both on economical and practical grounds. The Mond Gas Company had special mains for power gas, but this was a special case. In ordinary circumstances, there would be difficulties from laying and repairing mains; and, generally speaking, it would not be practicable. At the same time, there was something to be said for the point put by Mr. Doig Gibb, that if conditions were made such that, in order to comply with them a dearer gas had to be supplied to everybody in the area, it would have a serious effect on the industry.

The Committee then adjourned until the afternoon, when evidence was put forward by the National Gas Council. The first witness was

Mr. THOMAS GOULDEN, the President of the Institution of Gas Engineers and Chief Engineer to the Gas Light and Coke Company.

Witness impressed upon the Committee at the outset that the main point upon which the evidence of the National Gas Council bore was the conservation of coal and the economical production of the units of heat put into the gasholders.

The CHAIRMAN: Then you are here representing the National Gas Council rather than the Gas Light and Coke Company?

Mr. GOULDEN: I represent the gas industry generally.

Continuing, Mr. Goulden said the point was this. The Gas Regulation Act had been passed very much on the findings of the Fuel Research Board; and, in consequence of this, the industry was looking forward to a certain amount of elasticity in the means of manufacture that would enable it to put into the gasholders a very much larger number of heat units per ton of coal than had hitherto been possible. Put generally, this was economy in the production of heat units. So far as the Gas Light and Coke Company were concerned, their experience with carburetted water gas was really the history of that gas throughout the country. The Gas Light and Coke Company started to manufacture carburetted water gas in 1890, and had thus had thirty years' experience. The proportion of carburetted water gas manufactured had been gradually increased; and at the present time 29 p.ct. of the total productive power of the Company's plant was carburetted water gas plant. The quantity of water gas made was about 21 p.ct. of the total gas manufactured. The Gas Light and Coke Company were the first gas undertaking in the country to manufacture carburetted water gas; and throughout their whole experience it had never been found that the manufacture of it had had any deleterious effect upon the workmen.

The CHAIRMAN: I do not think the point is the danger to the workmen. I do not think anybody suggests that there is more danger to the workmen in the manufacture of carburetted water gas than coal gas. On this point, I think you will most probably have the Committee with you.

Mr. GOULDEN said it had a bearing in this way, that the men engaged in the manufacture of water gas were exposed to it alone; and as there were no more accidents to them, it followed that there was no greater danger in connection with carburetted water gas than with coal gas, so far as users were concerned,

The CHAIRMAN: I do not know that it follows.

Mr. GOULDEN: We should expect to have more accidents if it was a more dangerous gas to deal with.

Continuing his main evidence, Mr. Goulden (after giving some particulars of the Gas Light and Coke Company's undertaking) said there were several advantages derivable from the use and manufacture of carburetted water gas. In the first place, the raw material of its manufacture was coke—although anthracite was largely employed in America. In this country, however, coke might be said to be exclusively used, largely decreasing the amount of coal that otherwise would be carbonized by the gas undertakings of the country. The extent to which the gasification of coke produced in coal-gas manufacture was possible, and the resultant saving of coal, could be judged from the fact that the residual coke from a ton of coal, producing (say) 12,000 c.ft. of coal gas, was capable of transformation in a carburetted water gas plant into 23,000 c.ft. of gas, thus increasing the gaseous products from a ton of coal from 12,000 to 35,000 c.ft. The mixture of carburetted water gas and coal gas would together possess a potential heat value of 18,250,000 heat units, to which the coal gas alone would contribute some 6,500,000. In volume, such a mixture of carburetted water gas and coal gas would consist of 66 p.ct. of the former

and 34 p.ct. of the latter. During the year 1920, the Gas Light and Coke Company manufactured 20·91 p.ct. of its total production as water gas; and to have manufactured an equal quantity of coal gas would have required an additional 615,000 tons of coal. Therefore, the saving of coal to the country was an important point to be observed. The daily productive capacity of water gas and total gasification plant now installed in Great Britain and Ireland, was equal to 333½ million c.ft., which, operated for (say) 230 days per annum, would produce a quantity of gas which, for equal bulk, would require the carbonization of 6,400,000 tons of coal.

The CHAIRMAN: That is a very important question; but it seems to me that there is a flaw in the argument. It presumes that you use your own coke to produce water gas; and this coke is, therefore, not available for sale to the public. If the coke which had been used for water gas had been used for fuel, the country would have required less coal by the ordinary consumers burning coke instead of having to buy coal.

Mr. GOULDEN said that was so if the case was carried to the extreme possibility of gasifying all the coke made on the gas-works. This was not being done, and he did not suppose they would ever do so. The point made by the Chairman would be true if the coke withdrawn from the public use was not replaced by gas.

The CHAIRMAN: Do you put this forward as a net saving or a comparative saving?

Mr. GOULDEN: It is comparative.

Following up the point as to the saving of coal by the manufacture of carburetted water gas, Mr. Goulden read a letter of thanks from the Coal Controller, in which it was pointed out that during eighteen months (including the coal strike) the manufacture of carburetted water gas had resulted in a saving of 5¾ million tons of coal. This, he said, showed the possibilities attaching to the manufacture of water gas, although he did not suggest that it would be possible to make 100 p.ct. saving.

Dr. GRAY said he could not see the argument, unless it was on the assumption that the whole of the coke gasified was supplied to the public in the form of gas, and that the gas was used to get more efficient results.

Mr. GOULDEN replied that it must be admitted that greater efficiency was obtained with gas than solid fuel; but unless the public could be shown this, then the advantage he claimed would not, of course, be realized. The public was, however, being gradually shown the greater efficiency of gas. He was putting this forward as showing the possibilities in the complete gasification of coal, which was the ideal position with regard to the conversion of the heat units.

The CHAIRMAN said this was rather another point. What he had in mind was the fact that, although by complete gasification or the manufacture of water gas the Company used less coal, nevertheless by withdrawing a certain amount of coke from public use, the public had to make an additional call on the collieries to a like extent. Therefore, although there might be a comparative saving, he did not think there was the net saving which had been claimed.

Mr. GOULDEN said that at the present time there was a decided surplus of coke, and very much more water gas could be made before it was exhausted. As long as there was a surplus of coke, surely it was all to the good that the gas industry should be enabled to make more gas; and he put it forward as a fact for the information of the Committee that the water gas manufactured by the Gas Light and Coke Company resulted in a saving of 660,000 tons of coal, and the Gas Light and Coke Company constituted about one-tenth of the output of the whole country.

In answer to Mr. DOIG GIBB, witness stated that if every ton of coal which came into the gas-works was completely gasified, the resultant gas would be one-third coal gas and two-thirds water gas; and the quantity of carbon monoxide would be about 29 p.ct. With the most economical production—viz., complete gasification—29 p.ct. of carbon monoxide would be the maximum. His Company were not working a complete gasification system. The Dellwik system of complete gasification claimed something like 80,000 c.ft. of gas from the original ton of coal; and if the Gas Light and Coke Company adopted this system, the percentage of water gas would be increased to 35 p.ct. and the carbon monoxide would be about 34 to 40 p.ct.

Continuing, Mr. GOULDEN dealt with the advantages of water gas to the consumer. He used the generic term "water gas" because there were different degrees of carburation. The consumer gained in the higher thermal intensity owing to the presence of the carbon monoxide, which improved incandescent lighting and was also valuable for metallurgical purposes. It also increased the brightness of gas-fires. The carbon monoxide had a higher thermal intensity than any of the other constituent gases. Moreover, water gas had only about one-fifth or one-fourth the sulphur compounds which were present in coal gas. In the United States, carburetted water gas was used to an extent which entirely dwarfed anything likely except in an oil-producing country. In many of the large cities there it was used alone, without any proportion of coal gas; and this applied in Washington, New York, and other places. If any limitation was placed upon the amount of water gas that could be used, it would mean an immediate increase of cost to the consumer, because it would involve a very considerable expenditure to replace the water-gas plant by coal-gas plant, and to carry out extensions by means of coal-gas plant. Coal-gas plant cost three times water-gas plant of similar capacity; and he estimated that if his Company had to replace their water-gas plant by coal-gas plant, the additional cost of production due to the extra interest on capital alone would be 2d. per 1000 c.ft.

The CHAIRMAN: That is if the Committee decided that you should not use any water gas at all?

Mr. GOULDEN: Yes, or placed any limitation upon it.

The CHAIRMAN: But your present user is 21 p.ct.; and so far as you are concerned at present, if you were allowed to use 21 p.ct. of carburetted water gas, this question of capital cost would not arise?

Mr. GOULDEN: No. Continuing, he said there were many other advantages in the use of water gas, in addition to those he had mentioned. The plant occupied a very small space, and there were many concerns in the country which could not carry out extensions with coal-gas plant on their present sites. It was only by the use of water gas that they could keep pace with their increasing demands, without the expense of going to a new site, which would involve a tremendous increase in cost. Belfast was a noteworthy example. There they used 60 p.ct. of water gas, on account of the difficulty of finding a new site, or rather the expense which would be involved by so doing. By adding water-gas plant, which took up so little room, they were able to meet the demands.

The CHAIRMAN asked whether it would be a great hardship to Belfast if the proportion of water gas was restricted to 50 p.ct., as had been suggested by Dr. Haldane.

Mr. GOULDEN thought it would, on account of the difficulties of putting coal-gas plant on any but a new site. Another advantage of water-gas plant was the speed with which it could be brought into operation to meet sudden demands, such as when a fog occurred or snaps of cold weather. The Gas Light and Coke Company had spare plant available as a rule, and could bring it into operation at a few hours' notice, whereas with retort-houses and coal gas they wanted days to do so. The plant, in addition, occupied about one-third of the space, and required less men to operate it. All these things made for economy, and vitally affected the gas consumer, who benefited by them to the extent of five-sixths. Any increase, therefore, in expenditure fell upon the consumer in a similar manner. Again, the use of water-gas plants was an insurance against coal strikes, the threats of which were always hanging over the gas industry, as well as railway strikes, or interference with shipping, and so on. Any increase in the cost of coal must affect the consumption, which again would be bad both for the gas companies and the consumers, because the price would have to be increased still further to those who did use gas. For all these reasons, he submitted that the advantages of water gas were very great indeed; and the industry on that account ought to be left as free as possible to use any proportion of carbon monoxide which was found practicable.

The CHAIRMAN: Have your Company decided whether to continue to supply carburetted water gas or do they propose, consequent on the expense of oil, to rely upon blue water gas?

Mr. GOULDEN: We at present rely as far as we can upon coal gas, and we lightly carburet the water gas. We shall continue doing so, undoubtedly. One of our smallest stations (Shoreditch) had a blue water gas plant, but we recently replaced it by a carburetted water gas plant. Continuing, he said he wished to strengthen the point he had made as to the absence of danger with water gas, by handing in a list of accidents taken from the figures for the past ten years, during which large quantities of water gas had been supplied by the Gas Light and Coke Company. Incidentally, he added that had the quantity of water gas supplied during this period been made from coal, it would have necessitated the carbonization of an additional 25 million tons of coal. During this period of ten years, 15 deaths had been attributed to the inhalation of gas; and there were three cases in which death had been accelerated by inhalation—the persons in question being ill already. There were also 11 clear cases of suicide. These constituted all the fatal cases which had been reported to the Company during a period of ten years. There were also 51 cases in which the effects varied from nausea to complete unconsciousness. Thus the total deaths were 29 and the other cases 51 during the whole period. This was not an average; it worked-out to one death per one million tons of coal carbonized. With the present percentage of water gas, the proportion of carbon monoxide was 12 p.ct.; but there were a great number of concerns distributing a considerably larger proportion than this. Returns had been obtained by the National Gas Council which showed a large number of cases distributing a greater proportion of water gas—the higher figures running from 38 to 48 p.ct. as the average, while maximum proportions up to 61 p.ct., on emergency, had been used.

The CHAIRMAN: Dr. Haldane has suggested to the Committee to-day (I am not suggesting that the Committee will adopt it), that 20 p.ct. of carbon monoxide should be the limit, and that would allow 52 p.ct. of water gas. The figures you have just handed in from other undertakings are very striking figures.

Mr. GOULDEN: And I have letters from all these undertakings, which show there has been a general absence of accidents.

Dr. CARNWATH said he presumed witness would not like the percentage of carbon monoxide reduced below what it was at present.

Mr. GOULDEN replied that, in his opinion, the ordinary conditions of working would naturally put a limit to the proportion. He would hesitate to say what the limit might be, if a perfectly free hand was granted to the gas industry.

Dr. GRAY: Is it in your opinion at all probable that the whole of the coke available after gasifying the coal will be used for the making of water gas?

Mr. GOULDEN: No.

Then have you formed any idea as to the proportion which might be used for that purpose?—At present we are making 21 p.ct. of carburetted water gas on the system we work; but we do not use half the quantity of coke we have available. We are using about one-quarter of the coke we make.

But there might be places where the demand for coke is not great, and the proportion available for gas-making would be larger; and there may be districts where coal is dearer, which would favour the production of more water gas?—Yes, that is so.

Then you hold the view that it should be quite possible to carry this through to the extreme limit?—To the extreme limit that might be found practicable and economical.

What is your view with regard to the danger of distributing such a gas? Would you have any fear personally with a gas containing 35 to 40 p.ct. of carbon monoxide?—Such a gas would be very strong, and could not be mistaken. Until you get a straight water gas, you would not have a gas which had not got a strong odour. I certainly should not care to distribute pure water gas which was odourless.

The CHAIRMAN: The carbon monoxide has not an odour itself. You presume that some steps could be taken to provide it with an odour?

Mr. GOULDEN said that all the water gas which his Company sent out was associated with other gases that had a very pungent odour indeed.

Dr. CARNWATH remarked that if the ideal spoken of by the witness was worked up to, the gas companies would be distributing a gas containing 40 p.ct. of carbon monoxide, which would, according to Dr. Haldane, be 27 times more dangerous than coal gas.

Mr. GOULDEN said that was a matter of opinion; but economic possibilities at the present moment would not allow of such a high proportion of carbon monoxide. As far as his own Company were concerned, the present plant was arranged for one-third water gas, which would give something less than 19 p.ct. of carbon monoxide with blue water gas and 15 p.ct. with carburetted water gas.

Mr. DOIG GIBB: That is having regard to present conditions; but you would not like to bind yourselves down to that percentage if other economic conditions arose?

Mr. GOULDEN: Certainly not: and I protest against any limitation being put upon us. We do not wish to poison our customers, but to supply them with heat units at the lowest possible rate. We are business concerns, and we wish to do the very best we can for our customers. In the course of further evidence, he said that in a previous inquiry, under the chairmanship of Lord Belper, following which a report was addressed to the Home Secretary on Jan. 17, 1899, the late Prof. Vivian Lewes gave evidence that the danger point in a small room of 1000 c.ft. capacity, into which unlighted gas from a flat-flame burner at the rate of 6 c.ft. per hour was allowed to pass continuously, did not begin until the proportion of carbon monoxide in the gas was 16·6. This resulted in a proportion of 0·05 p.ct. of carbon monoxide in the atmosphere of the room. In respect of this proportion, Prof. Lewes had stated that his experience was that 0·05 p.ct. of carbon monoxide was a quantity which affected a person, but did not cause any serious effects, even after three or four hours' inhalation. The gas consumption of an incandescent burner of the upright type did not exceed 4 c.ft. per hour; so that the equivalent danger point would not be reached until the proportion of carbon monoxide in the gas coming from the burner was equal to 25 p.ct. To contain such a proportion of carbon monoxide, 75 p.ct. of water gas would be necessary —an impracticable proportion of the manufacture except by the use of coke previously stored for the purpose or imported from outside sources. It had been found from experience that where fatalities had occurred through a single burner, they had happened in every case where the ventilation in the room had been stopped, in the desire to keep the room warmer.

In the course of some further remarks, in which the letter from the Coal Controller was again referred to,

The CHAIRMAN said the position at the time referred to was abnormal; and the Coal Controller was bound to take the action he did, whether it was economical or not. He had only made the remarks he had done in order that the case for coal economy should not be overstated. The Committee quite realized the importance of this aspect of the question.

Replying to Mr. DOIG GIBB, as to the cost which the Gas Light and Coke Company would be put to if compelled to reduce the amount of water gas by 10 p.ct., Mr. Goulden said, roughly speaking, 50 p.ct. of the capital expenditure of the Company was represented on the works, and 50 p.ct. on distribution. The total cost in capital was £110 per 1000 c.ft. capacity; and any reduction in the quantity of water gas used would involve a proportionate increase in the coal-gas plant. Water-gas plant cost one-third that of coal-gas plant. Suicides could not be attributed to the presence of carbon monoxide, because there had been suicides with straight coal gas. In Scotland the coal gas had the same proportion of carbon monoxide as the gas sent out by the Gas Light and Coke Company, which contained 21 p.ct. of carburetted water gas. Many people considered that carbon monoxide was the same as carbon dioxide, whereas the danger from carbon monoxide was its resolution into carbon dioxide. He could not agree with Dr. Haldane that with 7 p.ct. of carbon monoxide in a straight coal gas, it was impossible to suffocate a person. He emphasized the greater care now exercised in the manufacture of gas-fittings, while the control over many of them which the gas companies had tended to further safety.

The CHAIRMAN asked Mr. Goulden's views on the point made by Dr. Haldane, that it was possible there might be public prejudice against gas containing a high percentage of carbon monoxide, and that this would prejudice the gas industry by decreased sales.

Mr. GOULDEN said he was quite convinced that the consumer judged what he wanted to have by the effect he got; and if it was assumed that the consumer got a better light and a brighter fire with the use of a particular gas, then he would prefer that. From his own point of view, he had not the slightest fear of any public prejudice being created if gas companies were given a free hand.

Mr. R. E. GIBSON, the Chief Engineer of the Liverpool Gas Company, was next called.

He said he had been asked to express the views of the various undertakings included in the Manchester District of the National Gas Council. These undertakings had blue water gas plants, carburetted water gas plants, and complete gasification plants—the total daily output of them being 56·26 million c.ft. At a largely attended meeting of the Manchester District Executive Board of the National Gas Council on Feb. 1, representing practically the whole of the undertakings in Lancashire and Cheshire, a resolution was unanimously passed to the effect that the limitation of carbon monoxide was quite unnecessary and undesirable. The view was also expressed that such a limitation would stand in the way of progress and would not be in the best interests of consumers.

The CHAIRMAN: Do you desire to have a free hand to go to even 100 p.ct. carburetted water gas if you found it economical?

Mr. GIBSON: Yes.

But is it not the situation that carburetted water gas is a diminishing quantity, and the tendency is to have a straight blue water gas?—That depends very much on the relative prices of the raw materials. I do not claim the 100 p.ct. for blue water gas, but for carburetted water gas.

Dr. GRAY: Unless this is defined, it comes practically to the same thing.

The CHAIRMAN: You are asking for an absolutely free hand to put in as much as you like?

Mr. GIBSON said that was so. Continuing, he said that the Departmental Committee appointed in 1898 to consider this matter stated that "the prospect of any serious result from the distribution of gas containing a high proportion of carbonic oxide, is practically confined to cases of large escapes into rooms where persons are asleep." The Committee recommended, among other things: "That power should be conferred upon a Central Department to make regulations . . . limiting the proportion of carbonic oxide in the public gas supply at night to 12 p.ct., or such greater amount as the Department may consider desirable." This recommendation was never enforced by Parliament; and further experience, since the report was published, had shown that such restrictions were quite unnecessary The Liverpool Gas Company were one of the first to introduce carburetted water gas into this country. The Company supplied an area containing a population of approximately 900,000; and from 1899 down to 1920 there had been 16 suicides and 38 accidental deaths from gas poisoning. Of the accidental deaths, 22 were in districts supplied with gas containing less than 12 p.ct. of carbon monoxide; and there were 16 in districts supplied with gas containing over 12 p.ct. Curiously enough, the statistics showed that the greater number of fatalities had occurred in districts that were supplied with gas containing the smaller percentage of carbon monoxide. It was added that even in coal gas the proportion of carbon monoxide varied. According to published figures it had been as high as 11 p.ct. At Liverpool, the plant capacity was 31 million cubic feet, of which 16·9 millions were coal gas and 14·1 millions water gas. This was equivalent to 18 p.ct. of carbon monoxide in the mixture. If a reduction of 4 p.ct. was made in the amount of carbon monoxide, the Company would be involved in a capital expenditure of £350,000 upon new plant for making the necessary quantity of coal gas. This figure was based on prices recently obtained for plant at Glasgow. Any such expenditure would mean a large increase in the price of gas.

In answer to the CHAIRMAN,

Mr. GIBSON said it was very difficult to state what the future proportion of water gas would be at Liverpool. There were no immediate plans to go beyond the present percentage. If all the coke at Liverpool was gasified, it would result in 37 p.ct. of coal gas and 63 p.ct. of water gas. The actual present position was that the coal-gas plant was being extended, for reasons other than those he had advanced in favour of water-gas plant. He supported the views put forward by Mr. Goulden as to the advantages of water-gas plant in regard to space occupied, speed of getting into operation, coal consumption, &c. Another advantage was the effect upon gasholder capacity. At Liverpool, the gasholder capacity was only 72 p.ct. of the maximum daily capacity; and without the water-gas plant he would require a gasholder of 3 million c.ft. capacity, which would cost £100,000, in addition to the £350,000 already referred to. From the latest Board of Trade returns, it seemed that the gas companies alone in 1919 made 28,723,808,000 c.ft. of water gas, as compared with 18,392,121,000 c.ft. in 1913—representing an increased saving in coal to the nation of 861,000 tons per annum. The total saving was much greater because the municipalities had not been included, owing to their returns not being available.

The CHAIRMAN thought the point made already as to the advantages of water gas in regard to the railway strike was a good one; but in relation to the war he did not think the argument ought to be carried too far. There were exceptional times then, and deductions ought to be made from the total savings which were claimed.

Mr. GIBSON said he did not claim this as the whole saving.

The CHAIRMAN: It is a mistake to overstate the case.

Mr. GIBSON, in the course of further evidence, said that large quantities of water gas had been supplied throughout the country for thirty years, and greatly increased quantities had been supplied during the war with no ill-effects. On the other hand, the consumer had been supplied with a gas requiring less air for combustion, giving a more intense flame, and containing less of the objectionable sulphur compounds than were found in straight coal gas.

The CHAIRMAN: I do not consider that argument is suggested. I think the point is accepted that there is less sulphur and the heat developed is greater.

This was generally assented to by the Committee.

Mr. GIBSON (continuing) pointed out that recent developments in gas manufacture had been in the direction of combining the production of water gas with that of coal gas in such processes as steaming in vertical retorts and "complete gasification." Limitation of carbon monoxide would no doubt arrest further development in this direction, and would result in existing plant being thrown out of use, with loss to the gas industry and the consumer.

The CHAIRMAN: When does this argument begin to be valid. At 14 p.ct.?

Mr. GIBSON: No; higher than that. One of the Lancashire engineers tells me that his content of carbon monoxide is 20 4 p.ct., when steaming in vertical retorts; but I cannot say the proportion of steam. Perhaps, when steaming, 20 p.ct. is getting beyond the economical limit.

After a reference to the effect upon the price of gas of throwing a lot of coke on the market, if the proportion of carbon monoxide was limited, for which there would not be much demand, witness dealt with the financial effects, which were summarized as the lower capital cost of carburetted water plant, the saving in gasholder storage capacity, and the comparatively small amount of labour required to work the plant, resulting in economy in interest charges and in working costs. At the same time, it was pointed out that the relative costs of coal gas and carburetted water gas were largely dependent on the comparative costs of the raw materials—coal and gas oil. Generally, witness urged that the restriction of the carbon monoxide content would not be in the best interests of the consumer, would seriously hamper the operations of a large number of gas undertakings, and, according to the available evidence, would not reduce the number of fatalities.

Dr. GRAY was disposed to find fault with the view that a limitation of carbon monoxide would not reduce the number of fatalities. If the gas contained 42 p.ct. of carbon monoxide, could witness have quite

an easy mind, and say that it was no more dangerous than gas containing 36 p.ct.?

Mr. GIBSON said the precautions would be such that, except in extraordinary circumstances, a fatality would not take place. In recent years, the quality of fittings had improved, and gasfitters had been trained to do their work much more efficiently.

Asked as to whether there were any special points upon which precautions should be taken if, for instance, the percentage of carbon monoxide was doubled, witness said he did not think we had yet reached the point of legislative action of this kind, especially in view of the fact that the greatest number of deaths in Liverpool had occurred where the percentage of carbon monoxide was smallest.

The CHAIRMAN: Surely that rather goes to show that the statistics are not very conclusive?

Mr. GIBSON: I think they are worth something.

Dr. GRAY: The type of resident has something to do with it.

Mr. GIBSON, questioned by Dr. Carnwath, said there was no doubt in his mind but that there should not be a limit fixed. At Liverpool, in 1899, they went up to 100 p.ct. of water gas; later it had been up to 81 p.ct.; and he had often sent out 50 p.ct. of carburetted water gas. This latter would mean 19 p.ct. of carbon monoxide. In the United States it was common for 100 p.ct. of carburetted water gas to be supplied, which would contain 25 p.ct. of carbon monoxide.

Mr. DOIG GIBB put some questions to show that Liverpool for years supplied a very high candle power gas.

At one time, said Mr. GIBSON, the equivalent calorific value was 620 B.Th.U.; but the standard now was 550—the actual being 480. As the calorific value had come down, there had been no greater danger to the public or the workmen; in fact, rather the contrary. Their chief pipelayer, who had probably inhaled more carbon monoxide than any other man in the Company's employ, recently died from natural causes at the age of 69. His Company would not be prepared to go up to 100 p.ct. of water gas straight away; but the industry must be allowed to progress in a natural way.

The CHAIRMAN mentioned, in the course of his questions, that the complete gasification of coal would lead to a reduction of the tar and tar products, though he did not wish to suggest that gas undertakings should exist for this purpose.

Mr. GIBSON, on the point of possible prejudice against gas by the public, mentioned by Dr. Haldane, said he shared Mr. Goulden's opinion that there need be no fear on this account.

Mr. T. F. E. RHEAD, the Chief Chemist in the Birmingham Corporation Gas Department, was next called.

He said that the department had five works, in four of which carburetted water gas was made. The total quantity was very large, although it only amounted to 22 p.ct. of the total on the average. During the twenty years that carburetted water gas had been made at Birmingham, there had been no fatal accidents on the plants due to gas poisoning. While the total make had increased by 62 p.ct. during that period, the water gas had increased from 17·6 to 21·3 p.ct. of the annual make.

The CHAIRMAN asked if this was likely to be the percentage in the future.

Mr. RHEAD said it was rather difficult to give an answer, because, like all other gas-works, the Birmingham undertaking was out to make the cheapest possible gas, and the whole industry at present was in such a state of flux that it was impossible to forecast what the position would be five or ten years hence. The present proportion of about 22 p.ct. of water gas, however, was likely to continue for two or three years, although the tendency would be to increase the proportion. During the coal strike, the quantity went up to 50 p.ct., and during fogs this proportion was always supplied, during which the carbon monoxide would be 18 or 19 p.ct. When blue water gas was added, in such emergencies, the quantity did not exceed 23 to 25 p.ct.

The CHAIRMAN: Then a restriction to 18 p.ct. of carbon monoxide would be inconvenient to you in times of emergency.

Mr. RHEAD, dealing with accidents, said that during the past twenty years in Birmingham, the deaths due to accidental gas poisoning had been six; and of these, five were victims of a dreadful accident.

Answering the CHAIRMAN, as to whether the Gas Department had all accidents reported to it,

Mr. RHEAD said he had been through the Coroner's records. As to fittings, he confirmed the previous evidence, and read a letter from his Fittings Superintendent, who suggested that gas undertakings should have the same statutory powers as water and electricity undertakings to pass all fittings before use. In order to induce builders to submit their fittings for inspection, the Birmingham Gas Department was offering certain inducements in the form of a certain length of pipe free. Dealing with the general position, witness contended that any limit of carbon monoxide would by no means eliminate whatever slight danger there might be when gas was wrongly used; but it would probably eliminate all possibility of the realization of cheap gas—one of the absolute essentials of our national prosperity both from a health and a wealth point of view. The possibilities of improved health conditions, bound-up with the substitution of the inefficient and smoke producing domestic grates by efficient gas-fires, were too far-reaching to be lightly set aside by putting unnecessary difficulties in the way of the manufacture of a cheaper gas. The deaths from ill-health produced from a smoke-laden and foggy atmosphere were obviously many times greater than those due to gas poisoning. The application of scientific methods to gas manufacture was rapidly increasing, and the Gas Regulation Act had given rise to a new-born hope of the possibility of cheaper and better gas. The carbonization of a portion of the 35 million tons of coal used annually in domestic grates would save the nation many millions of tons of coal per annum for the same services rendered. It would not pay to carbonize this coal unless gas could be made more cheaply than at present; and one of the controlling factors in this cheaper production was the addition to coal gas of gas manufactured (*a*) in water-gas generators, (*b*) by steaming charges in vertical retorts, (*c*) by complete gasification, which combines methods (*a*) and (*b*). In endeavouring to put carbon monoxide in its correct perspective, witness said it had the following useful properties: Its flame radiated 2·4 times as much heat as hydrogen, which rendered it helpful in metallurgical operations; it was less likely to give rise to explosive mixtures than either methane or hydrogen, because it required a minimum of 12·3 parts of carbon monoxide mixed with air to give an inflammable mixture, while methane required only 5·3 parts, and hydrogen 4·1 parts; it had a high flame temperature—a useful property in high temperature operations. Discussing the disadvantages of burning coal in open grates, and the advantages of gas-fires, witness said his experience was that people objected to gas-fires mostly on account of the price of gas.

The CHAIRMAN: Although there seems no immediate probability of Birmingham requiring a mixture containing more than 25 p.ct. of water gas, you think, in the interests of the general public, that it would be a mistake to put any limitation whatever on the amount of water gas allowed?

Mr. RHEAD: Absolutely.

And if undertakings decided to use 100 p.ct. of water gas, they should be allowed to do so?—Yes, if it would pay them. The advantages of gaseous fuel are so great that the public would gain very much more by having cheap gas than by putting legislation in the way of progress.

And you think that even a limitation of 50 p.ct., which at present would not affect you at all, would be a mistake, looking to the future?—Absolutely. I think there are several places using complete gasification plants now.

Yes, but we have to look at it as regards the position of the industry as a whole. If there is any interference, what will it mean?

Mr. DOIG GIBB said it would mean that at times when gas companies wanted to go beyond a certain point, they would be up against the law.

The CHAIRMAN said that where there were strict legal restrictions there was usually a clause covering emergencies.

Mr. RHEAD said he would like to call attention to the first conclusion in the Beilby report, upon which the Gas Regulation Act was largely based, as supporting absolutely the point of view which the National Gas Council were putting forward. So far as Birmingham was concerned, there were 100,000 slot-meters; and the department's fitters regularly inspected them—a fact that ensured safety which, however, would be still further increased if his Fittings Superintendent's suggestion was adopted, of statutory powers to inspect fittings before installation.

In answer to Dr. GRAY, witness said that while it would be quite safe to supply a pure water gas, he would prefer to have a gas with a smell. He would have no reluctance in distributing 100 p.ct. of blue water gas odorized, and did not agree that the risk from carbon monoxide increased in greater proportion than the percentage.

The CHAIRMAN thought that statement hardly coincided with Mr. Goulden's view.

Mr. GOULDEN said he held the same opinion, provided proper care was given to looking after the consumers' fittings.

At the close of the sitting,

Mr. GOULDEN said that several references had been made to Dr. Haldane's evidence; and he hoped an opportunity would be given to the National Gas Council to recall rebutting evidence if they thought it necessary after reading Dr. Haldane's evidence.

The CHAIRMAN suggested that the Secretary of the Committee should be communicated with later on.

The Committee then adjourned. The date of the next meeting was not fixed when the Committee rose.

Primitiva Gas Company of Buenos Ayres.

In a City Note last Wednesday, "The Times" said: For the sake of the long-suffering shareholders, it could be wished that the sanguine views of the position of the Primitiva Gas Company of Buenos Ayres that have been expressed in certain quarters lately had a better present foundation. But as optimism based merely on the recent substantial fall in the price of coal takes no cognizance of the serious troubles that still beset this hardly-used Company, it becomes necessary to state one or two facts of current application. For over two months, the undertaking has been plagued with a strike, which remains in being. The trouble, which originated in the employment by the Company of a few non-union men who have since been dismissed at the behest of the trades union, is preventing the Company from getting supplies of coal. There are to-day over 9000 tons of coal belonging to the Company lying on the wharf at Buenos Ayres, which the Dockers' Union refuse to allow delivery of; and the Company are back again to the war expedient of burning wood, bones, and even bran, in order to keep the retorts going. By such means, they are able to produce gas of a calorific value just sufficient to keep within the provisions of the recently-made contract. The accounts for 1920 will show a heavy loss on the year's working—the loss for October amounted to £8000, and that for November to £4000. Given a return to domestic peace, the Company should, with the advent of cheaper coal, begin to turn the corner; but the long, lean period has left a legacy of interest arrears on the preference shares that now amount to over £600,000—a figure that indicates the severe task still confronting the management.

Gas Examiners in London.—The London County Council last November authorized the appointment of eleven additional gas examiners for part-time work. The Public Control Committee had pointed out that there was a shortage of examiners available for Sunday duty, and indicated the manner in which the difficulties of testing had been accentuated by a recent change prescribed by the Gas Referees in the method of testing the gas of the South Metropolitan Gas Company. After investigation, eight candidates proved their suitability for appointment; and the Committee propose that they shall be added to the panel of gas examiners. The names are: Messrs. T. W. Harrison, C. K. Colwell, A. S. Carlos, A. E. Andrews, C. R. Dow, L. E. Campbell, H. C. Cocks, and H. D. G. Holt.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary General Meeting of the Proprietors of this Company was held at the Cannon Street Hotel, E.C., last Wednesday afternoon —Dr. CHARLES CARPENTER in the chair.

The SECRETARY (Mr. Frank Day) read the advertisement convening the meeting, and the minutes of the last ordinary general meeting and an extraordinary meeting. Thereafter the seal of the Company was affixed to the "Register of Proprietors."

THE ADDRESS OF THE CHAIRMAN.

The CHAIRMAN, on rising to address the meeting, said: Ladies and Gentlemen,—This is the twenty-fourth occasion on which I have had the honour of addressing you from this chair; and it will be the first of the annual meetings which it is in future proposed to hold. Whatever doubts may have been felt as to the desirability of the longer interval, have been removed as the result of the experience of the last twelve months. In pre-war days, the half-yearly meetings were generally pleasant functions—not differing very greatly one from another, nor in the statements made from the chair; but when we look back upon those times, we realize how heavy and anxious are the responsibilities which post-war conditions have placed upon us, and we see that a survey extending over the whole of 1920 gives us a truer picture than would be obtained by the juxtaposition of its two halves, because the first half started very promisingly, and the second half terminated very disappointingly. Assuming that you will, according to custom, take the report as read, I will adopt its paragraphs as divisions of the remarks I intend to make.

FINANCIAL PROPOSALS.

In framing our post-war policy as to the financial basis upon which we should endeavour to reconstruct our undertaking, we had the choice of two alternatives. The obvious one was to amend our sliding-scale by the application thereto of a higher standard price for gas. This, you will remember, was the course—purely a war-time expedient—which we adopted in 1917, when we joined with most other gas companies in an endeavour to obtain some relief from Parliament of the unjust working of the scale. The proposal, which was a perfectly simple measure of relief, was viewed with disfavour, and was finally set aside for the arbitrary regulation which has since, and until last year, authorized the payment of our meagre dividend. We were, therefore, not predisposed to rely a second time upon joint action with the industry—fearing that, as it had proved unable to obtain a fair measure of justice in 1918, it might equally fail in 1920. But there was a still more important factor to be considered. It did not appear that any future relief that could be granted *en bloc* would go further than a restoration of the pre-war position; and a feeling had long been gathering strength among your Board that the remuneration of gas capital had been out-distanced by the altered circumstances of its investment, and the changed conditions under which it had to compete for business. These fears turned out to be well-grounded; and I would draw your special attention to the fact that the Gas Regulation Act, passed at the instance of the Board of Trade, was expressly framed with the object of reconstituting the pre-war position, and nothing further.

THE RE-ESTABLISHMENT OF THE ECONOMIC BASIS.

We, therefore, as you are aware, decided to cut ourselves adrift from the impedimenta of the sliding-scale, and a year ago asked and obtained your consent to the promotion of a Bill aiming at the re-establishment of the economic basis of the undertaking upon a sounder foundation than the old one had proved itself to be. With one exception, Parliament adopted *in toto* our proposals. They were exceedingly simple ones, and were founded upon experience which had proved that the state of things to be taken into consideration in 1920 was not comparable with that prevailing in 1875, when the sliding-scale was initiated. A third partner had been taken into the partnership between consumer and shareholder, the identification of the interest between whom was the object of the earlier legislation. Moreover, competition of the keenest possible character had come to the rescue of gas undertakings, and had lifted them up from the reproachful status of mere monopolies to that of organizations conducted on a business footing in common with other industries, and like them susceptible to the stimulus of competition in ensuring a high order of business enterprise and management. Now, our Act of last session identifies the interests of consumer, capitalist, and employee. For the first-named—the consumer—it fixes in his interest a fair or "basic" price (using the words of the Act) for his commodity—in this case, gas. For the second—the capitalist—it fixes a fair rate for the use of his money; not, mark you, limiting any further profits capital is encouraged to seek by the exploration of all avenues for economical working, for the extension of business, or arising out of the state of the markets in respect of raw material or of bye-products. But, by the adoption of the principle indicated, capital secures a living wage, to which it is entitled under all vicissitudes—just as labour is entitled to its living wage under precisely similar conditions.

KEEPING DOWN THE PRICE OF GAS.

Now, ladies and gentlemen, what will happen if, and when, profits accumulate beyond what is absorbed in providing the consumer with gas at the fair or basic price, capital with its fair remuneration for its use, and labour with its fair wages for its services? Three-fourths of such surplus profit will be allocated to the consumer by way of reduction in the price charged for gas, and the remainder will be divided equally between capital and labour—that is to say, between the shareholder and the employee. All three parties to this tripartite partnership are thus secured—in the one case a fair price, in each of the other two cases a fair return. These latter are, therefore, provided with a stimulus to do their best for the undertaking by the knowledge that, while three-fourths of the result—the lion's share, in fact—goes to the consumer, they may reasonably look forward to a substantial portion for themselves. Now, it is very important that you should not imagine that this is going to take place forthwith. As a matter of fact, the future is extremely uncertain; and no one knows what is going to happen in relation either to our raw material, coal, or to our bye-products, coke, ammonia, &c., during the next twelve months or so. We have got to proceed very warily, remembering that our primary duty to-day is to do nothing which is likely to injure in any way a business which is at present in an extremely healthy condition. We want to do all we can to keep down the price of gas to something like its present figure, and not to alarm the consumer, and risk permanently damaging our relations with him, by even temporarily raising our price to get over our near-future difficulties, so long as we can possibly avoid it. Prices are at the moment far from stabilized. We must be patient, and wait with prudence—knowing that, if we are not sharing profits on the scale to which we are entitled with justice, we are at least getting paid at the basic rate for the use of our money till better times come.

THE ORDINARY DIVIDEND.

In connection with this, you will remember that, in promoting our Bill, we expected to get 6 p.ct. on all our ordinary stock. Parliament, however, divided old stock from new in this respect; and, while allowing 6 p.ct. on future issues, fixed 5 p.ct. for the present stock. It was a disappointment; but, after all, recognition of the new principle goes a long way to compensate existing shareholders for the limitation to the lower figure. These rates have become a cardinal feature of our new charter, and will remain undisturbed, even though the unexpected course of events may impel us to seek in due course a revision of the present figure, now constituting a fair or basic price for gas. In future, therefore, your 5 p.ct. or 6 p.ct., as the case may be, will be assured in all circumstances; and what you will receive in addition thereto will vary according as trading conditions fluctuate.

The new Act removes another injustice, which I must not omit to point out. Under the old sliding-scale, if in any quarter—say, the heaviest one of the year—gas is sold at a lower price than in the succeeding, and light one, no account of this is taken as regards the half-yearly dividend, since the highest price charged in the period is the governing factor for dividend purposes. By the new Act, however, should a price below the basic figure be charged during any period of the year or half year, a proportionate advantage accrues to the shareholder and the employee, in the manner described—and, moreover, a share which is based upon the actual monetary advantage enjoyed by the consumer. An example is perhaps better than what I fear is a somewhat involved description. If all our gas supplied during 1920 had been sold on the new basis, and at the price charged during the last quarter, the extra return on capital would have been something over 10s. p.ct.

EXPENDITURE AND INCOME.

Turning now to the accounts, we find ourselves confronted with some very striking figures. Our expenditure is now over five million pounds per annum, of which salaries and wages account for over two millions, and coal for another two-and-one-third millions, of which something like two-thirds is also for labour. Our gas and fittings rental only provides us with three-and-one-third million pounds to meet this; and we should not have balanced expenditure with income, had it not been for the remarkable buoyancy of residuals. The high-water mark of these has passed, and a strong ebb set in, the extent of which it is impossible to forecast. Unfortunately, too, the miners' strike ruined for this season our export trade in coke, on which we largely rely for our ability to meet our heavy coal bill. Apart from the burden on the consumer and the loss of revenue to the country, the cost and loss due to stacking coke amount to a very large sum; and the money locked-up in these stocks could be put to better use.

COAL DECONTROL.

We regard with satisfaction the coming decontrol of the mining industry. Our coal supply has never been of worse quality than during the period production and distribution have been under Government control; and this furnishes one more example of the invariable result, with which most people have become acquainted during the last few years—namely, that the more completely an industry is in Government hands, the less efficient does it become. ["Hear, hear."] In such matters, the country's interests become nobody's interests, with results of a kind to which the report refers; while the public suffer and pay. With coal supplies again in private hands, we shall be able to exercise some influence for the improvement of its quality. In one important respect, however, it is to be hoped an invaluable lesson has been taught us by the war. Before 1914, much of our best coking coal went abroad that should have been retained in this country for conversion into bye-products. We can carry out this conversion every bit as well as the Germans, who would then have to purchase from us such products as they required and we could spare, while we should retain the profit on working, with the advantage of more employment and an increased production of liquid fuel and tar products. ["Hear, hear."]

BUSINESS INCREASES AND BROADENS.

The next paragraph of the report deals with the sales of gas; and here we have a satisfactory condition of things to mention. Our business not only continues to increase, but its basis broadens; and developments for industrial uses grow in a variety of directions. The proposals of the Fuel Research Board are now fairly widely known and understood. They were based upon the simple and equitable principle of giving value for money, whatever quality of gas it was desired to supply. A statement made recently may be taken as an example of the unfairness of the old system. It was reported that we charged the same price for gas during fifteen months as a neighbouring undertaking. This was the truth, but not the whole truth; for the statement omitted to mention the fact that the heating value of this Company's gas was about 15 p.ct. greater than the other, though the charge per volume was the same.

THE NEW BASIS OF CHARGE.

It is satisfactory to note that the new basis of charge has met with widespread approval; and this is all the more gratifying when it is remembered that the proposal was cordially supported by this Company from its earliest stages. Great praise is due to our staff for the admirable manner in which they set to work to demonstrate that the new system could be made a complete success, notwithstanding that a

number of gas experts decided it to be impracticable. Not its least important characteristic is the fact that, for the first time in the history of gas supply, it will ensure gas of practically constant value being made and distributed, and thus relieve consumers from inconvenience and annoyance such as they have suffered in the past by reason of variations in quality.

A Department of the Board of Trade has now been constituted with duties wholly appertaining to matters relating to gas supply; and the recognition of the right of this industry to be included to-day among the essential public services will go far to restore confidence in its possibilities for the future—a feeling which was rudely shaken during the war. The extension of the powers of the Gas Referees—hitherto Metropolitan—to the country generally, will be of great advantage to the public by raising the general standard of gas supply, not only when in the hands of companies, but also (and this is certainly of equal importance) where undertakings are owned by municipal authorities.

ENCOURAGE HOME INDUSTRIES.

As regards the manufacture of dye products, the story is a very chequered one. Manufacturers have often been chided upon their apathy in this respect. This charge to-day is—and was, indeed, throughout the war—an unfounded one. If we had not been a nation of shipbuilders it would have taken us years of learning and training before we could have turned out "Queen Elizabeths" or "Aquitanias." The Germans learned their shipbuilding largely from us; and we can learn dye-making from them, given time and encouragement such as they had. It must be a blow to the public, who experienced the powers of "Dora" in many trivial affairs of the nation, to think that she was powerless to exclude the admission during last November of £1,881,275 worth of German dyes—an increase over the previous month's figure of £1,528,532. It is true the Act passed in the closing hours of last session will do something to obviate this in future; but it is unfortunate that the country was allowed to be flooded throughout its length and breadth with these chemicals before the mischief was stopped.

Now, is the same thing going to happen with heat-resisting glass? One of the most important firms of glass manufacturers in England has been for the past two or three years engaged in building-up an industry of this character. The quality of their product is equal to the German article; and the finish is fast approaching the same high level. Naturally, the firm need sympathetic help in their endeavours during the period necessary to establish their manufactures on a basis which will enable them to meet foreign competition on equal terms. Surely, it is an obvious duty of Parliament to encourage production in home industries, and not to stand by passively watching their destruction.

THE CASE OF SULPHATE OF AMMONIA.

It seems not a little difficult to understand the reasons determining this attitude of the Government to a manufacturer seeking to build-up a new industry, while at the same time giving support to a trust formed mainly to control prices. This is, however, what has happened in the case of sulphate of ammonia. We have been bound hand and foot to the Sulphate of Ammonia Federation; and except through that organization, we are unable to export a single ton of our make of a product over 90 p.ct. of which was exported prior to the war. In the manufacture of this article we have proved that our chemists can produce on a working scale a material of the very highest quality. And it is monstrously unfair that we should have been inhibited from selling direct to our customers, without the enforced intervention of a Trust, whatever proportion of our make could, in common with that of other manufacturers, be spared for export. ["Hear, hear."]

SYMPATHETIC LABOUR.

The next paragraph deals with the question of capital. I shall fully explain the character of our proposals at the Wharncliffe meeting which is to follow this one. For the moment, I will only say we do not seek any additional capital powers, but merely desire greater freedom in the issue of what has already been authorized.

The last statement in the report with which I need trouble you is concerned with our relationship with our employees. If any justification were needed for my occupying your time in this matter, I would ask you to bear in mind those unparalleled charges for labour to which I referred earlier, and by which, as you will readily believe, our entire financial position is dominated. You will need no further words of mine to impress you with the importance of knowing whether that labour which absorbs so large a proportion of our revenue is well disposed to us or otherwise—anxious and willing to give us service to the full, or loth to furnish more than a minimum of effort. Well, fortunately, I am able to speak confidently on this subject. I have recently held and addressed something like fifteen meetings of our employees, at each of which some hundreds of them were present. I discussed the inter-dependence of capital and labour, and outlined the details of that relationship as existing at any rate in this Company for the last twenty or thirty years. I heard not one discordant voice. No one raised the slightest criticism of the principles I enunciated; and no one called in question their fairness and soundness. All gave evidence of an earnest desire to do everything possible to further the progress of the undertaking, especially during the difficult times through which we are passing. Moreover, they viewed not unsympathetically suggestions that an increasing amount of their savings might be applied towards our capital needs. [Applause.] This attitude is especially noteworthy by reason of the fact that no co-partnership bonus on wages has for some time been paid. It proves that the spirit of co-partnership denotes something more than a participation in mere material advantages, and gives evidence of its being founded on a wider and deeper basis.

NO INTERFERENCE.

Let me give you another example. On June 12 last, we received, in common with, I believe, all London Gas Companies, a note from the trade unions concerned of a general strike of gas-works employees to take place the following week. It would appear that, despite the enormous increase in wages to which I have referred, some additional demands had been made, compliance with which had been somewhat delayed. We replied to the unions that we did not recognize in any way their authority to give this strike notice in respect of our employees. ["Hear, hear."] I need not say we should not have been in a position to take up this attitude had we bartered our freedom to the union officials in return for their support of our parliamentary relief proposals. A few days later, at the first meeting of our Co-Partnership Committee subsequent to the notice, the following resolution was submitted from the employees' elected representatives, and was unanimously passed:

> "That this Committee, being duly elected and appointed under the co-partnership rules of the South Metropolitan Gas Company for the purpose of dealing with matters affecting the conditions of employment of the Company's workpeople, does not recognize the claims of any other body or organization to interfere with this Committee's powers and decisions; and authorizes the Company to repudiate any such interference, from whatever source it may come." [Applause.]

THE COMPANY'S WAR MEMORIAL.

I dealt very fully a year ago with the question of war service; and it is fitting that I should to-day make reference to what has been done in the matter of a memorial to those who lost their lives in that stupendous struggle. We gave the subject consideration from various standpoints; and we came to the conclusion at last that the best memorial we could provide was one which would take into account the necessities of the living. For this purpose, we purchased on the sea coast, at Mundesley, a suitable house, with a certain amount of ground attached. The object of this is to provide a convalescent home, first of all for those of our employees whose health has been shattered by the war, and secondly for the benefit of those who from time to time fall out in the life, more or less of a strenuous character, that they pass in the employment of the Company.

AN EXAMPLE TO BE FOLLOWED.

May I remind you, in conclusion, that for thirty years our employees have received—if I may use a hackneyed expression—a share of the wealth they have helped to produce? And, further, may I recall the fact that it is now 22 years since they were given, by an overwhelming majority of your votes, a voice in the management? No one, from the Board downwards, will affirm otherwise than that these two great experiments have, in the fulness of time, proved to be unqualified successes. How each has contributed to the welfare of the Company, the staff would answer you with no uncertain voice. Is it out of place to express the hope that the example we have so long provided of the elimination of the so-called labour troubles from our anxieties, is capable of a wider and more general extension throughout the land, strengthening thereby those bulwarks of liberty and freedom which have made our beloved country great among the nations? [Applause.]

I beg to move—

> "That the report and accounts now presented be received and adopted, and the report entered on the minutes."

The DEPUTY-CHAIRMAN (Mr. Frank H. Jones): I will say nothing to spoil the very effective statement we have had from the Chairman, but will formally second the resolution he has just read to you.

The CHAIRMAN: The matter is now open for discussion; and we shall be very pleased to hear any remarks you may have to make or questions you would like to ask.

POINTS RAISED BY PROPRIETORS.

Mr. HAVELOCK WEST: As to this Act of Parliament which is giving us 5 p.ct. interest, after 3 p.ct., it seems to me that is small enough. I do not like the reference that is made in the course of the report to the dirt and stone shipped from the mines with the coal. Are there no means of stopping this trouble? I see there is a temporary loan of £460,000. Is it absolutely necessary for us to go to the bank? Another point with regard to investments. What is the total amount of our investments outside the Company? Allow me to congratulate our late Secretary on his appointment as General Manager. ["Hear, hear."] When I have had to trouble him, I have always received the greatest courtesy at his hands. I should like to support the motion.

Mr. J. W. SOUTH: There are two points with regard to which I should be glad to have some further information, "Parliamentary charges, £11,393," seems to me to be an enormous sum of money to spend in one year; and I think we are entitled to a little explanation as to why so much was expended, and why so little satisfaction was obtained. I say this very deliberately, having regard to the fact that we have been restricted to 3 p.ct. during the last six years, which has hit very hardly indeed shareholders who have been dependent upon their income from gas companies. The other item is "Depreciation of war loan investment." I should like to hear about this.

Mr. D. T. BOYLE: With reference to the reserve, renewal, and special purposes funds, where does the interest come from which is added to these funds? In the reserve fund there is the statement, "To be invested £115,032." What is it doing to earn the interest which is credited to the account? What would happen if it were invested? In connection with the renewal fund and special purposes fund, the same question arises. If amounts are invested, what are they invested in?

Mr. A. F. BEZANT: I should like to congratulate you, Sir, upon the excellent accounts you have submitted this afternoon, also upon the price that in current circumstances you are charging per therm, as well as upon the innovation that you have introduced in connection with the basic price and the division of profits when charging below the basic price. But there is a little complaint I have to make; and it is that, in your accounts on this occasion, you have given your stockholders a large amount of arithmetical exercise to perform, if they want to make comparisons of the figures with the year 1919. In the first place, it is necessary for the proprietor who is seeking information from the accounts to add together the figures for the two half years of 1919 before he can compare them with those of the year 1920. It would have been well, I think, if you had given the figures for the year 1919 alongside those of 1920. Then, in the report, you state that the number of therms you have produced per ton of coal is 70·45. Now,

in this connection, it would be very interesting if, in future accounts, you would state the average number of British thermal units you supply per cubic foot—that is to say, the actual number, as against the declared value. In view of the omission on this occasion, it is absolutely impossible to test the accuracy of your figures. Of course, I do not dispute them for a moment. I know Mr. M'Leod and Mr. Day would not make any error of the kind; but, at the same time, those who take an interest in the affairs of the Company from a technical point of view, cannot from the figures make a proper comparison. In the next place, I should like to ask you to consider the question of including in the statement of gas made and gas sold a column, or a footnote, showing the number of British thermal units which are supplied to the consumer in excess of the declared quantity, in view of the fact that this difference must otherwise, it seems to me, appear in the unaccounted-for gas. This would be unfair to the distribution system. The only other suggestion I should like to make is that, when the accounts for 1921 are issued, the whole of the gas made and supplied in 1920 should be converted to therms, and included in the accounts, so that a direct comparison can be made with the figures for 1921.

A PROPRIETOR: I understand the Board have decided in future only to render accounts to the shareholders once a year. Does this mean that they will only pay one dividend a year, or two as before?

THE CHAIRMAN'S REPLY.

The CHAIRMAN: If there are no other questions, I will endeavour to reply to those that have been put. In reply to the last speaker, though we intend only to submit annual accounts, we propose to declare interim dividends at about the same time as the dividend for the first half year has usually been declared and warrants posted; so that the procedure will be much the same as before.

A question was asked as to the investment of the money to the credit of the reserve, renewal, and special purposes funds. One of the reasons why comparatively small amounts of these funds are invested to-day arises from our great need for floating capital. In order to reduce as far as possible our obligations to the bank or bankers, we are using the uninvested funds in our business. As we use them in our business, it is only right that these funds should be paid from our revenue the amount of interest that they would have been entitled to had they been invested. In other words, we credit them with interest at the same rate that we should have had to pay the bank had we borrowed these particular sums from them. All three accounts are in the same category.

Mr. BOYLE: I can only say that, if we had to realize our reserve and renewal funds, we should have to sell our property.

The CHAIRMAN: If you did not have to realize during the war, it is not likely you will have to under post-war conditions. You have got to provide an increasing amount of money to carry on the business, which is very much more extensive to-day than it was in 1913. This floating or working capital has to be provided from somewhere. Part we have obtained from the bank; and we have supplemented this by raising as much as possible of these three funds. This is the definite policy which the Board have adopted; and it has been explained over and over again at meetings of this kind. ["Hear, hear."] We have got to have the money, and to use these funds in the business is what we have been doing.

Another question asked was with reference to the large amount of money that has been paid for parliamentary charges. Well, it is somewhat disappointing for a question of this kind to have been asked this afternoon, because it does exhibit an unexpected disregard of what has been done. ["Hear, hear."] In 1920, we obtained an epoch-making Act, putting our undertaking on a foundation different altogether from what it stood on before, and when you say that £11,000 seems a large sum of money, do you realize that the increased dividend of 5 p.ct. for the year could not be paid but for the promotion of that Bill. Is the cost an unreasonable one, having regard to what has been gained by it? [Applause.]

I have been asked questions with regard to the accounts. The matter of therms has been raised, and a wish has been expressed by the speaker that more information on points desired by him had been included in the accounts. The reply is that these returns are made in accordance with statutory requirements. The statute governing gas undertakings requires that we should furnish this form; and we have furnished it. To some extent, we give more information than we are required to give. We give it when we feel it can be given without doing injury to the interests of the undertaking. The speaker expressed his inability to obtain from the accounts the true factor in the comparative working of last year with the previous one. Well, if he will look at the beginning of the third paragraph of the report, he will find the key to the whole position, because it is stated there that the increased sale of gas is 5·43 p.ct. This means that the gas sold in 1920, translated into therms, compares to that extent with the figure for 1919, also converted into therms. In regard to the comparative figures, there must be an interval during which the half-yearly figures that have been customary have to become yearly ones.

One shareholder referred to the mention in the report of the difficulty of getting clean coal. Well, in the North of England we have a unique organization, in order as far as possible to ensure that the coal is kept at a high quality. Unfortunately, it has been during the last two or three years somewhat difficult to get full advantage taken of the machinery provided; but we have a very complete arrangement by which a large-scale sample is taken of every cargo of coal which leaves the Tyne for our works on the Thames. This sample is taken to our offices in Newcastle, and carefully tested. The results are telegraphed from the North to London; so that before the ship arrives and we begin to unload it, we have got an idea of the sort of coal it is. In due course, I believe, we shall be able to interest the colliery people in sending us coal of the highest quality.

With regard to the war loan, we, as you know, in common with most other similar undertakings in the country, bought war loan. It was considered patriotic to do so; and I believe it was. We held it till the time came when we thought we should realize it. We made, I was going to say, the inevitable loss. Let us hope we shall not have an opportunity in our lifetime of having to decide whether we shall follow the same course again.

I am rather inclined to think I have answered now the whole of the questions put to me. If so, I will put the resolution. It is carried.

THE DIVIDEND.

The CHAIRMAN: Now I have to move—

> "That dividends as follows for the year ended Dec. 31 last be now declared—viz., 5 p.ct. on the redeemable preference stock, and 5 p.ct. on the ordinary stock, and that the warrants be transmitted to the registered addresses of the proprietors by post for the amount of such dividends, less the interim dividends paid in respect of the first half of the year."

I will ask Mr. Beard, the newly-elected Employee Director, to second this.

Mr. W. C. BEARD: Before I do so, as this is my first appearance on this platform, I should like to say how deeply I feel the honour my fellow co-partners have conferred upon me in electing me to a position on the Board. At the time when the scheme was adopted, I believe that some were apprehensive as to what might happen when the workers entered the Board Room. Nothing untoward did happen; and I think by this time it has been proved conclusively that the experiment has been productive of nothing but good, both from the Directors' point of view and also that of the workers. ["Hear, hear."] After what the Chairman has said, it is hardly necessary for me to say anything about the benefits that have been derived from the scheme. The Directors of the Company have had a most difficult, trying, and anxious time for the last six or seven years; but there is one thing to be remembered, which is that they have not had the extra burden and anxiety laid on them of finding that there was a likelihood of any labour trouble. If co-partnership has accomplished nothing but this, it has done a great thing. ["Hear, hear."] Before sitting down, I should like to say how much I value and appreciate the kind and courteous way in which we have been received in the Board Room. My work there will be a liberal education to me. I beg to second the motion.

The resolution was then put to the meeting, and agreed to.

THE RESERVE FUND.

The CHAIRMAN: I next have to move—

> "That the moneys forming the reserve fund now existing, and any accretions thereto, be invested and applied as the Directors may from time to time deem expedient; and that the Directors be empowered to vary any such investments at their discretion."

You will remember that we asked you last year for, and you agreed to give us, wider powers than we possessed in regard to investment. Provision is made for this by the Act; and the resolution will enable the section of the Act to be carried into effect.

Mr. A. M. PADDON seconded the motion, which was carried.

RE-ELECTIONS.

The DEPUTY-CHAIRMAN: I have pleasure in proposing that Dr. Charles Carpenter be re-elected a Director of the Company. There is no need for me to attempt to explain why he should be re-elected. He is very necessary to your Company. Besides re-electing him, I want you to allow me to tell the Chairman that we thank him very sincerely for the very, very hard work he has done, and for the extremely generous manner in which he has devoted to the Company his great ability, his great energy, and the whole of his time. He is here to-day against the doctor's orders. We congratulate him on the result of his labours in getting the Company into something like the position it should occupy. [Applause.]

Mr. FRANK BUSH: I have great pleasure in seconding the proposition. In Dr. Carpenter we have, as you all know, a greatly gifted man ["Hear, hear"]; and his energy in the Company's business is unique. By his manly, dignified, and patriotic discharge of his duty, he has shown himself to be without doubt the right man to fill the position he has attained, and which he so worthily occupies. I should like to have added to the resolution the words: "and that his visits to the works be limited to two days a week." [Laughter.]

The DEPUTY-CHAIRMAN: I do not think we will limit the Chairman in this way; but we will thank him and congratulate him.

The resolution was then carried with applause.

The CHAIRMAN: I am much obliged to you for the warmth of your reception. I will say nothing more with regard to the work it has been my privilege to perform than that I had a duty placed upon me twelve years ago. I have endeavoured to fulfil it to the best of my ability; and I am pleased to have your assurance that I have not failed. I now propose that Mr. E. Honoratus Lloyd, K.C., be elected a Director. I am sorry to say he is not able to be present to-day. He has proved himself to be a most admirable and useful member of the Board.

Mr. JOHN MEWS: I have pleasure in seconding that. Mr. Honoratus Lloyd is very useful to us; and we owe him our thanks for what he has done.

The motion was carried, as also was one for the re-appointment as an Auditor of Mr. Charles Mortimer, on the proposition of Mr. PASSMORE, seconded by Mr. CHARLES WEBB.

The CHAIRMAN: That concludes the business of the ordinary meeting; and we now become an extraordinary meeting.

AN EXTRAORDINARY MEETING.

APPROVAL OF THE COMPANY'S BILL.

The CHAIRMAN: I have first to ask the Secretary to read the notice convening the extraordinary meeting.

The SECRETARY thereupon read the notice.

The CHAIRMAN: Ladies and Gentlemen,—The objects of the Bill to which we are asking your consent are very simple. They are mainly concerned with the issue of capital. You will remember that in 1916 and 1918 we promoted two Bills dealing, *inter alia*, with this matter. By the two resultant Acts, we are authorized to raise £651,104 of ordinary stock, and £1,312,500 of various denominations of loan capital,

both temporary and permanent. By the new Bill we propose, while reducing the gross total of these powers by £100,000, to re-classify the remainder into £1,152,104 of ordinary stock and £712,500 of loan capital. The ordinary capital will, of course, be 6 p.ct., carrying with it participation in profits as described to you earlier this afternoon; and the remainder will be of such denomination, and bearing such rate of interest, as may be found necessary. It is further proposed by the Bill to issue the statement of capital in a simpler form than is now the case. The would-be investor desires to see this as clearly and concisely expressed as possible, without being burdened by a confusing statement of the financial history of the Company since the year 1842. The whole of this information is available, down to the smallest details, and is in the hands of all officially interested therein. And the simpler a picture we can give of the capital liability of the Company, the more likely are we to attract the investing public.

The remaining matter of interest in the Bill pertains to the Board of Management. We desire to make law a principle which has to a great extent been followed throughout our past history, and for which may be fairly claimed much of our success as a prosperous and progressive organization. The duties undertaken by the head of this Company are of a much more extended kind than those embraced by the Chairmanship of the Board. He should give leadership and inspiration to the whole staff in technical, scientific, commercial, and labour matters. He is, indeed, a President over the undertaking as a whole; and, as experience has proved that this qualification is the needed one for the position, it is considered desirable to give it the official status and recognition. The present members of the Board all possess training of a kind which makes their counsel advantageous to the conduct of gas undertakings; and the usual power is sought to constitute such of them Managing-Directors as from time to time may be deemed desirable. Permission is also asked to increase the number of Auditors to three, as and when necessary, and for power to fix their remuneration.

The Chairman then went through the preamble of the Bill, and the various clauses, and moved:

> "That the Bill now submitted to this meeting, entitled 'A Bill to amend the capital powers of the South Metropolitan Gas Company and for other purposes,' be, and the same is hereby, approved, subject to such additions, alterations, and variations as Parliament may think fit to make therein."

The DEPUTY-CHAIRMAN: I second that.

Mr. WEST: Is the total amount of fresh capital you require definite or indefinite?

The CHAIRMAN: We are asking for no fresh capital powers; we do not require to do so. We are asking that capital now temporary may be made permanent.

The resolution was then put to the meeting, and carried.

VOTES OF THANKS.

The CHAIRMAN: Before I sit down, I should like to take the opportunity to ask you to give a vote of thanks for the admirable manner in which the staff have carried out their duties. As years go by, these duties do not get any less difficult or less complicated; and it is very pleasant to be able to say that the energy and earnestness thrown into the endeavour to cope with them increase year by year. In other words, while our difficulties increase, the endeavours of our staff to meet them increase also. I propose a hearty vote of thanks to them.

The resolution was seconded from the body of the hall, and passed with great cordiality.

Mr. FREDERICK M'LEOD (the General Manager), in reply, said the whole staff were at one in their constant endeavour to serve the Company. During the past year special demands had been made on a large section of the staff, comprising the clerical and the commercial departments. The new method of selling gas had, of course, involved an enormous change in vision and in work, inasmuch as all engaged in the industry had been taught to live, move, and have their being in "cubic feet" calculations, and the change to therms, the conversion of one term into another, had presented many difficulties. Their staff, however, realizing a year ago that the change was imminent, prepared for the new *régime*; and, thus, when the new Act came into operation they were well prepared. They had now had three months' experience—a short period, but sufficient as a test. Hundreds of thousands of accounts had been prepared and sent out, and the new method had worked smoothly. The public had not experienced the slightest irritation through the change. He attributed all this to the co-operative spirit engendered by their co-partnership scheme of the last thirty years. Gas men, too, realized they had obligations to the public—knowing that on the efficiency and promptitude of their work the comfort and happiness of millions of people depended. With the help and guidance the staff received day by day from the Board—not to speak of the encouragement given to them by the shareholders at the periodical meetings—the staff would be encouraged to continue to give prompt and efficient service to the Company and to the public.

On the proposition of Mr. PASSMORE, seconded by Mr. WEST, an equally cordial vote of thanks was passed to the Chairman and the Directors.

The CHAIRMAN: I could have done very little indeed had I not been so admirably supported by the Board. Had the Board not entered thoroughly and completely into the proposals made, revolutionary as they are in their character, I should have been powerless, like a general without an army.

A Meter that Gives Change—By means of an extra attachment (the invention of Mr. Ernest Tiller, of Harmsworth Street, Southwark), slot-meters will, says the "Daily Mirror," return twelve pennies already placed in the meter for every shilling inserted; these twelve pennies, by reason of their weight, passing into a special coin-box. The weight of the twelve pennies, no matter how thin or thick, shifts a lever, so that the thirteenth penny drops into the ordinary coin-box. A shilling, placed in a slot and pushed in, levers open a door; and the slot, when pulled out again, brings twelve pennies with it.

TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY.

The Annual Meeting of the Company was held last Friday, at the Offices, No. 639, High Road, Tottenham—the Rt. Hon. Sir DANIEL F. GODDARD in the chair.

The SECRETARY (Mr. E. J. K. Fussell) read the notice calling the meeting; and the Directors' report and the accounts were taken as read.

CAPITAL EXPENDITURE AND COSTLY PLANT AND MONEY.

The CHAIRMAN, in moving the adoption of the report and accounts, said he was very happy to be able to report a successful year's working. As the proprietors knew, the Company had been for some years under the shadow of a heavy cloud caused by the war. Now they were emerging. The light was breaking; and they began to see their way to brighter times. No doubt the principal event of the year to the gas industry had been the passing of the Gas Regulation Act, which had been called, and might be regarded as, a new charter for the gas industry. He would enter into some explanation of the effects of the Act before he had finished; but he thought it better to deal first with the more prosaic items of the accounts. The capital expenditure for the year amounted to £33,582. From this had to be deducted the sum of £17,459 on account of depreciations and sale of land—leaving the capital expenditure for the year at £16,122. The largest item in this expenditure was for new stoves and fires. This the Directors regarded as a very hopeful sign. It showed the growth of the business, because during the past year no less than 2625 new stoves and fires had been fixed in their area; and so they might well conclude from this that, at all events for heating purposes, gas continued to hold its own. On electricity capital account, they had expended £10,915. This, of course, was due to the great demand for electric lighting in the Wood Green area. This branch of their business was still quite young. But it was sound, and was now yielding a revenue profit of £1916—roughly 5 p.ct. on the outlay; and he might tell them there was an increase in the output equal to 54 p.ct. on the previous year. It would be seen that there was an overspent balance on capital account amounting to £125,232. The Directors would be very glad to wipe this out by raising new capital; but they had been waiting until at all events they could offer to investors better interest on the money. The proprietors would perhaps realize what he meant if he gave them an illustration. In 1913, they built an excellent tank at a cost of £16,000, suitable for a gasholder of 6¾ million cubic feet capacity. The war came; and the contract for the holder was cancelled. The Directors would very much like to enter into a new contract now for a holder, because one was needed. But a holder, which before the war would have cost £28,400 on a definite tender, would now cost four times the amount, or over £100,000. As would be readily understood, with money at the present price, this sum would make a tremendous demand upon the Company's funds—no less than £8000 a year—in extra charges. This made one hesitate to spend money in present circumstances. He gave this as an illustration of the difficulties the gas industry had to face.

HEAVY UNAVOIDABLE INCREASES IN WORKING EXPENDITURE.

Turning to the revenue account, he did not propose to go into every item in detail. The proprietors would get a better grasp of the subject if he treated the items as a whole. The total expenditure for the year was £899,588. This was rather a staggering figure, and was £233,381 more than in 1919. Of course they would ask, and would have every right to ask, how the Directors accounted for this increased expenditure. He would tell them. First of all there was coal. On coal, the increased cost had been £123,231. This was partly due to having to use 22,000 tons more than in the previous year; and it was also owing to the fact that they had to pay for their coal 46s. per ton, instead of 37s. On oil there was an increase of £6580. This was entirely due—more coal had been used, and less oil—to the fact that the price of oil had gone up from just over 3d. per gallon to an average of 11½d. Then there were wages and salaries. The increase of these two items all over the accounts amounted to £53,732. Then he came to the important item of repairs. He had put the repairs together on works, mains, meters, and stoves; and there was an increase of £46,628. This, of course, was due to the high wages, and more costly materials. Then they came to the rates (not taxes), which had increased by £7027 in the year. This, he thought, was rather an interesting figure. At the last quarter's payment of rates, they were paying to the tune of £26,000 a year; while the net cash payments to the proprietors only came to £18,000. They would understand from this that those who had invested their money in the industry were getting less interest for it than the authorities on account of rates. Adding these figures together, they had an increase in expenditure of £237,198; and all these items of outlay were outside the control of the Directors. They could not be avoided; they were advances nobody could avoid.

CO-PARTNERSHIP.

He should like here to make one observation in reeference to co-partnership. The Company, for many years now, as the proprietors knew, had in existence a co-partnership scheme. Since the war the co-partnership scheme had become of very little interest—in fact, under the scheme of co-partnership, there had been no bonus paid to the co-partners at all, except that the Directors decided they would maintain the insurance pension money as a gratuity to co-partners. He might say that the Directors had now resolved that, directly the Order was obtained under the Gas Regulation Act, and something like the pre-war dividends were re-established, the first thing they would take into account would be the readjustment of the position of the co-partners.

GAS SALES AND BYE-PRODUCTS.

Turning to the other side of the revenue account. They had experienced an enormous increase in cost; and the proprietors would naturally ask how the increased cost was to be met. It was met mainly by two items—by a very good return from secondary products, and by a rise in the price of gas. Perhaps the proprietors would allow him to remind them that now even the price of gas could not be decided

by the Directors of themselves. The Company had to prove to the Board of Trade, at an inquiry at which all opponents could be present, the need for an increase; and a decision was given as to the actual amount that they might charge for gas. They went before the Board of Trade, and proved their case; and the Board of Trade assented to the price being raised to 5s. 1d. per 1000 c.ft. One item he was sure would be of interest to the proprietors. It would be remembered the Government insisted upon the return to the consumers of 10s. per ton upon all coal used for domestic purposes. The Company carried out the injunction of the Government; and the sum paid back to the consumers for domestic gas used in the Company's area was £29,538, which was equivalent to 8d. per 1000 c.ft. The sale of gas increased during the year by 7 p.ct.—a very good increase, as would be agreed when it was realized that it meant 172 million cubic feet. The additional revenue was made up as follows: The sale of gas brought in a further £120,023; the rental of meters and appliances, £26,000; and secondary products, £93,380. This was a tremendous and most extraordinary figure. For tar, the average realized through the year was 9¾d. per gallon; whereas formerly they were very glad to get 2½d and 3d. per gallon. For coke, they had had an increase of 6s. per ton; for sulphate of ammonia, they had an extra 26s. per ton. The total increase of receipts was £239,088, after setting aside £6000 to the renewal account. So in the end the revenue profit for 1920 amounted to £50,070, as against £44,364 in 1919, or an advance of £5707.

THE ELECTRICITY UNDERTAKING AT WOOD GREEN.

On the electricity account, they obtained powers from the Ministry of Transport (who now had charge of electricity matters) to increase the maximum price from 7d. to 9d. per unit. The Directors had availed themselves of this power to raise the charge to 8d. The electricity undertaking was growing rapidly. In the first half of last year, they had an increase in the sales of electricity equal to 89 p.ct. over the previous year; and on the whole year it worked out to 54 p.ct. The demand was still growing—growing so rapidly that further extension of the plant was in hand. For this they had first to obtain the consent of the Ministry of Transport, which was just another example of the effect of Government control on such industries as their own.

THE PROFIT AND LOSS ACCOUNT.

Turning to the profit and loss account, there were only two items to which he wished to call attention. The first was the sum of £500 which this year they carried to the electricity renewal fund. It seemed wise to the Directors that, having regard to the rapid growth of this department, they should set aside some sum to meet the renewals which were bound to be required. The other item was £3118 received in respect of income-tax in 1919, which was due to the fact that they made less profit in 1918, and a rebate of income-tax was made. It was an item that would not recur; and therefore he mentioned it, so that the proprietors might not expect to see it again in next year's balance-sheet. The reserves, including the carry-forward after paying the dividend, now amounted to £95,920, which compared with £89,202 in 1919. So in this respect they were improving.

COAL AND COAL-WAGONS.

Turning to the balance-sheet, perhaps somebody might notice there was an increase—a considerable increase—in sundry tradesmen's accounts. This was due to the fact that, after the coal strike, they had to make good the coal stock; and a good deal of the coal they got in for meeting their requirements was not paid for in December. There was another noticeable item in the balance-sheet—sundry stores in stock. This was easily explained. It meant that they had purchased 100 coal-wagons. They had had the greatest difficulty in getting in their coal, as the companies concerned would not hire the necessary trucks. The Directors therefore felt obliged, for the security of the business, to buy these trucks. They had put down 25 p.ct. of the cost; and the balance was to be paid in seven years in equal payments. This accounted for the large increase in stocks.

OFFICIAL CHANGES.

Mr. Wardell, who was formerly Assistant Manager at the Willoughby Lane works, had taken up an appointment at the Peterborough Gas-Works; and the Directors had appointed Mr. H. C. Smith, of the technical staff of the Birmingham Corporation Gas Department, as Works Manager at Willoughby Lane.

THE GAS REGULATION ACT.

He would now like to make a few explanatory remarks in regard to the Gas Regulation Act. The proprietors would, of course, be aware that the statutory sliding-scale, which was adopted as a benefit to the consumer as well as to the shareholder—giving a much larger benefit to the former than to the latter—and which worked very satisfactorily in normal times, worked very badly when they came to war times. War time increased the cost of coal and all labour so much that the price of gas was obliged to be forced up. This meant such a serious diminution of the dividend that the effect was very great indeed. But for the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, the dividend they would be allowed to pay to-day on their "A" stock would be £2 17s. 6d. p.ct., and on the "B" stock (which was eight-ninths of their whole capital) £1 7s. p.ct. The Act enabled them, however, to pay now £3 15s. p.ct. upon the "A" stock, and £2 12s. 6d. upon the "B" stock. This was very small indeed. The proprietors felt it to be small. He did himself; and everybody in the gas industry felt it. But it was the most they were allowed to pay by law. Before the war most gas companies had no difficulty in raising the additional capital they required at about 5 p.ct., including the premiums they received. To-day 7½ p.ct. was not at all an unusual figure to have to pay for money; and there were no premiums. The pre-war capital had depreciated by quite 50 p.ct. In fact, taking a specific case, the "B" stock, which before the war stood at 116, was now not more than 52. This was how the capital value had fallen. This serious state of affairs was constantly brought to the attention of the Government; and then at last the Government realized that the position of these public utility companies was so seriously prejudiced that it had beome almost impossible to obtain the capital required to carry on their business, that the gas industry was one of great importance to the country and the community, that the price of gas in the circumstances was bound to go up, and that, indeed, the industry would be practically ruined if some remedy were not found. This having become the opinion of the Government, last year the Gas Regulation Act was passed. Under the Act the Board of Trade had authority to make an Order to alter the standard price of gas on which the sliding-scale was based, so as to take into account any costs and charges incidental to the making and supplying of gas over which, owing to the changes that had come about, gas undertakings had no control, and which they could not possibly avoid. It was quite simple. It meant that the pre-war standard price of gas should be amended and adjusted so as to re-establish the scale of authorized dividends as far as possible on the pre-war basis. This was the object of the Act. Naturally in such an Act, safeguards were provided for the protection of gas consumers, in regard to quality and pressure. The matter might seem a little complicated; but the principal safeguard was that the gas was to be examined not for its illuminating value, but for its heating or calorific value. He had no objection (none of them had any) to this. In these days the heating value of the gas was the most important property. So the fiat had gone forth that in future gas was to be measured and sold, not by cubic feet, but by a new expression—the therm. The proprietors would say, What was a "therm?" A therm consisted of 100,000 British thermal units. What was a British thermal unit? The amount of heat required to raise the temperature of 1 lb. of water 1° Fahr. It all amounted to this, that if the gas supplied had a heating value of 460 or 470 B.Th.U. per cubic foot, the consumer whose meter registered 1000 c.ft. would be charged for 4·6 or 4·7 therms. He had no doubt this seemed very complicated, and very unnecessary. He was bound to say, although he thought it a great improvement in the interests of the public that there should be a change from basing the value of gas on illuminating power to heating value, for the life of him he could not understand why these confusing terms should be introduced. But he thought he might allay any alarm the consumers might feel by saying at once they could go on as they had been doing. They would use the same meters; and all the calculations necessary to change the cubic feet into therms would be made in the Company's office. The consumers need not trouble about the matter at all.

THE COMPANY'S APPLICATION—THE PRICE PER THERM.

The Company had, of course, made an application to the Board of Trade for an Order. Their case had been partly heard by the Director of Gas Administration; and at the present moment it was *sub judice*. He was sorry he could not give more definite information about it; but he was not able to do so, because they had not yet the decision of the Director on the subject. What the Directors were asking for in their Order was a price of 1s. 7d. per therm. This was equivalent, taking the gas at 470 B.Th.U. per c.ft. to 7s. 5d. per 1000 c.ft. But he would ask them not to run away with the impression that, because the Company were asking for this standard, it was the price they were going to charge. The object was to charge a good deal less, so as to increase the dividends to something like the pre-war amounts. If the Company sold their gas at 1s. 2d. per therm, whatever the standard fixed, then it would represent a charge for gas at 5s. 4½d. per 1000 c.ft. They were now charging 5s. 1d. This would give the proprietors an idea of the proposals. Whether the Company would get the 1s. 7d. per therm, he was not able to say. The Directors hoped for the best. The application had been opposed a good deal in one way or another by the local authorities. However, his own confident hope was that the next dividend (of course, this would depend upon how quickly a decision was made) would be a good deal nearer the pre-war one than the proprietors had been receiving for some years. The effect of this would be that the value of the stock would go up again; and this happy event would be very welcome to the proprietors.

AS TO THE FUTURE.

No prophecies could be made regarding the future, because there were so many uncertain elements which could not be estimated. For instance, they knew now that coal was to be decontrolled. Would this mean a rise or a fall in the price of coal? Nobody at the moment could say. What they did know was that after the decontrol of coal, they would at all events be able to buy coal where they liked, instead of having to take any kind of rubbish which might be sent to them, as had been the case during the last few years. From this he had the best of hopes that, if they had better quality coal, they would get better results. Another uncertain point was that at the present moment there was a tremendous slump in the value of bye-products. It was earnestly hoped this would not continue very long, and that they would soon recover. But he did not think he ought to tell them that in any case they would realize the same prices in the current year that they had done in the past very successful year. In spite of all this, he did believe they were justified in looking forward to brighter and more prosperous times.

Mr. HENRY BAILEY seconded the motion.

Mr. A. CUNIO said the Chairman had given them a very glowing and satisfactory account of the future; and he was perfectly aware of the cloud under which the Company, and other gas companies, had been for some years past. As Chairman of the Harringay Ratepayers' Association, he had been bombarded by questions as to the amount of gas wasted by street lamps in the district being alight in the day as well as at night. He had been informed that this was no loss to the ratepayers, but to the Company. He gave instances, and said that during the past two years there must have been a tremendous amount of gas lost. He thought it was time the matter was looked into. He was often questioned, too, as to bad gas and bad lighting; and his reply to this was that the ratepayers did not understand the difficulties the Company had had to go through.

Mr. D. MOORE said he was glad to hear that a better time was coming; and he was pleased to know that the Board had sympathy with the poorer shareholders. He hoped the miners and workpeople would now be content with their wages. At the rate at which he bought his shares, they only paid him just about 2 p.ct. He confirmed the previous speaker as to seeing lamps burning during the day.

Mr. W. BROWN called attention to lamps burning outside the Co-operative Stores and other large buildings after they were closed. He

was informed that they had the lamps at a contract rate, so that it did not make any difference to the Company. Regarding the increase in the rates, he thought the Company, as a large ratepaying undertaking, ought to take some note of it. He really did not see why they should not pass a resolution calling upon the local authorities to take steps to keep down the rates. It was up to the ratepayers to saywhether the rates were going up or not. They had proved that by combination the middle classes could check the waste.

The CHAIRMAN, in reply, said in regard to the public lighting the fact was that since 1917 the control of the public lamps had been in the hands not of the Company but of the Tottenham District Council. The Company were at the point of another agreement with the Council, when the control would revert to the Company; and, when this happened, the matter to which attention had been drawn would be prevented in the future. As to the lamps outside certain large establishments, these were high-pressure lamps. They were used entirely for advertisement purposes, and were paid for by contract time. If people liked to pay for them in this way, the Company could not find any fault. It was not the Company's loss in any way. The Company had nothing to do with the rates; but they would be glad when they fell. Their sympathies were with those who wished them down.

The motion was unanimously carried.

THE DIVIDENDS.

The DEPUTY-CHAIRMAN (Mr. Henry Woodall), in moving the resolution as to the payment of the dividend, said that, although a small one, he hoped that, when next the Directors had the pleasure of meeting the proprietors, they would be able to propose one more to the proprietors' liking. There seemed every reason why this should be so under the Gas Regulation Act. He then moved the resolution confirming the interim payments, and declaring dividends for the past half year at the rate of 5 p.ct. per annum on the preference stock, 3¾ p.ct. per annum on the "A" stock, and £2 12s. 6d. p.ct. per annum on the "B" stock, all less income-tax.

Mr. JAMES RANDALL seconded the motion, which was unanimously carried.

RE-ELECTIONS.

The CHAIRMAN moved the re-election of Mr. Henry Bailey, one of the retiring Directors. He mentioned that Mr. Bailey was the oldest Director—not in point of years, but of service. He had been a Director for about 25 years, and had done invaluable work, especially in connection with the Finance Committee.

Mr. H. D. ELLIS seconded the motion, which was unanimously carried.

Mr. BAILEY returned thanks for the confidence placed in him by the proprietors. From his earliest years, he had taken great interest in the Company, as he used to attend the meetings with his father. He had a financial interest in the Company which was somewhat large, so that it was worth his while, apart from his duty as a Director, to give from the personal point of view a great deal of attention to the affairs of the Company. Therefore he should, as hitherto, continue to do his best in the interests of the proprietors generally.

The CHAIRMAN said he had next to propose the re-election of Mr. James Randall, who did yeoman service for the Company for a great many years as its Secretary. He was an admirable Secretary; and when he retired from that post, he was made a Director. He (the Chairman) was sure the proprietors would wish to continue seeing him a member of the Board.

Mr. GEORGE HAY MORGAN, K.C., seconded the motion, which was unanimously carried.

Mr. RANDALL acknowledged the renewed confidence of the proprietors.

On the motion of Mr. SIDNEY SMITH, seconded by Mr. A. W. REID, Mr. John Eve was re-elected one of the Auditors.

Mr. EVE, in returning thanks, alluded to the enormous increase in the finances of the Company since 1914—the year in which he first took part in the audit. This meant a great increase in the work; but though much labour was involved, there was a great deal of pleasure in the work, because the books were kept so splendidly.

A VOTE OF THANKS.

Mr. H. MITCHELL proposed a vote of thanks to the Chairman, Directors, and Auditors, as well as to the officers, their staffs, and the workmen. In the course of his remarks, he said there was hardly anyone in the room who had not suffered a heavy capital loss on his investments in the Company; but no one could help it. He should, however, like to say that in safeguarding the interests of the proprietors generally, the Directors were also looking after the interests of many persons who in these days hardly knew how to live. There were many small stockholders in the Company; and he was sure the Chairman and those acting with him would remember their urgent needs.

Mr. F. R. SMITH seconded the motion, observing that the proprietors were fortunate in having a Board so well acquainted with the gas industry.

The motion was heartily agreed to.

The CHAIRMAN thanked the mover and seconder for their kind words, and the proprietors generally for their acceptance of the motion. The Board, he said, had felt the strain of the last few years; and they were looking forward with anticipation and pleasure to some better and easier years.

Mr. A. E. BROADBERRY (Chief Engineer and General Manager), on behalf of all the officers, the staffs, and workmen, thanked the proprietors. He added that he was glad to have the opportunity of saying that, during the trying years that they had been in the wilderness, it had been a great comfort to the officers to have been led by such a Board of Directors as they had. They gave valuable help and advice, as well as direction, in all matters with which the officers had to deal.

Opposition to London Gas Bills.—The London County Council have decided by an absolute majority to oppose the South Metropolitan Gas Bill, and the Wandsworth, Wimbledon, and Epsom District Gas Bill.

SOUTH SUBURBAN GAS COMPANY.

At the annual meeting of the Company next Friday, the Directors will report that further increases in the cost of both labour and coal made it necessary to raise the price of gas by 3d. per 1000 c.ft. as from the Michaelmas quarter—namely, to the maximum allowed by the Board of Trade Order of Oct. 28, 1919.

The net revenue account shows that, including the balance of £9028 brought forward from the previous year, and after providing for debenture and other interest, and the dividend paid for the half year ended June 30 last, the amount available for dividend is £29 345, out of which the Directors recommend (subject to authorization by the Board of Trade) the payment of a dividend for the past half year at the rate of £3 15s. p.ct. per annum (less income-tax) on the 5 p.ct. ordinary stock, carrying forward to the next account the sum of £8949.

Under the Gas Regulation Act, 1920, application has been made to enable the Company to alter the basis of charge for gas from cubic feet to heat units, and for a standard price for gas at per therm, in accordance with the terms of the Act. This application is under consideration by the Board of Trade.

The sales of gas show an increase over those of the previous year of 8·26 p.ct. The number of consumers has increased by 1842; and 823 cookers, fires, and other appliances have been sold to consumers.

The Public Utility Companies (Capital Issues) Act, 1920, increases the borrowing powers of such companies from one-third to one-half the paid-up share capital, subject to the consent of the Board of Trade. This consent having been obtained, debenture stock to the extent of £150,000, bearing interest at the rate of 7 p.ct. per annum, and redeemable at par in 1930, was offered at par, and the greater portion taken up.

It is with very great regret that the Directors report the death, early last month, of Mr. E. W. Drew, who had been Auditor of the Company since February, 1913.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" of applications by gas undertakings to the Board of Trade for Orders under the Gas Regulation Act.

Gravesend and Milton Gas Light Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 2d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. 2d. per therm.

Hemel Hempstead District Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 2d. per 1000 c.ft. within so much of the borough of Hemel Hempstead as is within 1½ miles of Hemel Hempstead parish church; and for gas supplied within any part of their limits of supply which is not within 1½ miles of Hemel Hempstead parish church a price not exceeding the price for the time being charged to consumers under like circumstances within 1½ miles of Hemel Hempstead parish church by more than the following amounts: Within any part of the said borough which is not within 1½ miles of Hemel Hempstead parish church, 4d. per 1000 c.ft.; and within any part of the limits of supply which is not within the said borough, 8d. per 1000 c.ft. With a proviso that the undertakers may charge in any part of the said borough which is not within 1½ miles of Hemel Hempstead parish church or in any one or more parishes or places outside the borough a price or prices less than the prices which they are authorized to charge in such part of the said borough or in such parishes or places, provided that the reduced price in any such parish or place shall not at any time be less than the highest price charged during the same time to ordinary consumers within the borough.

The standard price which the undertakers have asked the Board of Trade to substitute for this price is 1s. 7d. per therm for gas supplied within so much of the borough as is within 1½ miles of Hemel Hempstead parish church, and for gas supplied by them within any part of their limits of supply which is not within 1½ miles of Hemel Hempstead parish church a price not exceeding the price for the time being charged to consumers under like circumstances within 1½ miles of Hemel Hempstead parish church by more than the following amounts: Within any part of the borough which is not within 1½ miles of Hemel Hempstead parish church, 0·8d. per therm; and within any part of the limits of supply which is not within the borough, 1·6d. per therm. With a proviso that the undertakers may charge in any part of the borough which is not within 1½ miles of Hemel Hempstead parish church or in any one or more parishes or places outside the borough a price or prices less than the prices which they are authorized to charge in such part of the borough or in such parishes or places, provided that the reduced price in any such parish or place shall not at any time be less than the highest price charged during the same time to ordinary consumers within the borough.

Godalming Gas and Coke Company, Ltd.

The standard price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

It is provided by section 23 of the Godalming Gas Order, 1904, confirmed by the Gas Orders Confirmation (No. 1) Act, 1904 (*inter alia*), that in respect of any year during any part of which the price charged by the undertakers shall have been 1d. or part of a 1d. above the said standard price of 5s., the dividend payable by the undertakers shall be reduced as therein provided; and that in respect of any year during the whole of which the price charged for gas supplied within the parishes of Godalming, Compton, Witley, and Hambledon, in the county of Surrey, shall not exceed 4s. 3d. per 1000 c.ft. and for gas supplied in the parish of Chiddingfold, in the said county, shall not exceed 4s. 9d. per 1000 c.ft., the dividend payable may, in respect of each 1d.

by which the standard price has been reduced, be increased as therein provided. It is proposed to alter section 23 by substituting therein 0·2d. for the sum of 1d.; 18·5d. per therm for 4s. 3d. per 1000 c.ft.; and 19·6d. per therm for 4s. 9d. per 1000 c.ft.

Newcastle-upon-Tyne and Gateshead Gas Company.

The Company ask also for such modifications of any provisions whereby the rate of dividend payable by the undertakers or any other payment is dependent on the price of gas, as may appear to the Board of Trade to be necessary.

The standard and maximum prices now authorized in respect of the supply of gas by the undertakers are a standard price of 2s. 9d. per 1000 c.ft. and a maximum price of 3s. 4d. per 1000 c.ft. in Newcastle-upon-Tyne and Gateshead, and 4s. per 1000 c.ft. in other areas supplied by the undertakers; and the prices which they have asked the Board of Trade to substitute for these are: A standard price of 1s. 3·2d. per therm, and maximum prices of 1s. 4·6d. and 1s. 6·2d. respectively per therm.

Pembroke District Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft. within the borough of Pembroke and within a radius of 2½ miles from the gas-works in the borough (called the "inner area"), with a provision that the price charged for gas supplied in any other part of their limits of supply (called the "outer area") shall, for a period of not less than five years from the passing of the Pembroke District Gas Act, 1919, at all times exceed the price for the time being charged in the inner area by 6d. per 1000 c.ft., and may at any time after that period exceed the price charged in the inner area by not more than 6d. per 1000 c.ft. But the undertakers may at any time after the said period of five years charge in any part or parts of the outer area a price or prices lower than the price or prices charged in any other part or parts of the outer area; but such lower prices shall not be less than the price for the time being charged in the inner area.

The standard price which they have asked the Board of Trade to substitute for the said standard price of 5s. per 1000 c.ft. is 1s. 10d. per therm within the inner area, with a provision that the price charged for gas supplied in the outer area shall for a period of not less than five years from the passing of the Act of 1919 at all times exceed the price for the time being charged in the inner area by 1½d. per therm, and may at any time after that period exceed the price charged in the inner area by not more than 1½d. per therm. But the undertakers may at any time after the said period of five years charge in any part or parts of the outer area a price or prices lower than the price or prices charged in any other part or parts of the outer area; but such lower prices shall not be less than the price for the time being charged in the inner area.

Salisbury Gas Light and Coke Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 5s. per 1000 c.ft. within the City of Salisbury, and 4s. for public lamps within the city, and 6s. 6d. per 1000 c.ft. within any other parts of their limits. The price they have asked the Board of Trade to substitute for these is 1s. 8d. per therm.

Stamford and St. Martin's Stamford Baron Gas Light and Coke Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 9d. per therm.

GAS LIGHT AND COKE COMPANY'S CHARGES.

London County Council Resolution.

At the Meeting of the London County Council, on Tuesday of last week, some discussion arose out of the address by Mr. Milne Watson at the recent meeting of the Gas Light and Coke Company.

Mr. W. C. JOHNSON (St. George's, Whitechapel), on the reception of the report of the Public Control Committee, referred to the speech made by the Governor of the Gas Light and Coke Company at the last annual meeting, and moved: "That it be an instruction to the Committee to take such action as is possible to prevent the Gas Light and Coke Company from charging a higher price for gas, and yet look forward (whatever the conditions of the coal, oil, and residuals markets) to an increased dividend, as announced by the Governor of the Company at the annual general meeting on Feb. 4, 1921."

Sir GEORGE PIGGOTT (the Chairman of the Committee), in accepting the motion, said that it had been the desire of the Committee to protect to the utmost the interests of the public with regard to the question of the price and quality of gas supplied by the different companies. The Order obtained from the Board of Trade had not come into the Committee's hands at the time the report was passed. It would, however, be considered at the next meeting of the Committee, and a report brought up in due course. He reminded Mr. Johnson that, under the Gas Regulation Act of 1920, the companies had a right to apply to be put on a pre-war basis; and the Board of Trade could issue an Order defining the terms on which the price of gas should be fixed.

The motion was adopted.

Malton Gas Company.—The half-yearly report of the Malton Gas Company shows that shortage of supplies of coal from the usual sources, in addition to higher costs, has necessitated the purchase of coal of an inferior quality elsewhere at an enhanced price. Materials and labour costs have been higher generally. The gas consumed shows a rise of 13 p.ct. on the corresponding period of 1919; and this, with the satisfactory prices obtained for residuals, has enabled an avoidance of an increased price for gas. The present rate is 4s. per 1000 c.ft. The balance available for distribution from the revenue account is £2505. A dividend of 5 p.ct. for the half year—making 10 p.ct. for the year—will leave £1665 to be carried forward.

THE EXTRACTION OF BENZOLE.

Interview with Prof. Cobb.

The "Yorkshire Post" publishes the following account of an interview on the subject of motor fuels, with Prof. J. W. Cobb, of Leeds University.

Much attention has been given to the extraction of spirit from tar. Benzole is the outcome; but the quantity obtainable is not large enough. The alternative is to obtain substitutes from solid fuels, such as coal, shale, lignite, &c.—the material being submitted to some retorting or gasification process which drives off the volatile elements. Most English shales are too high in sulphur for this purpose. When the difficulty is got over, this large class of spirit-producing media will be available. Experiments are being prosecuted at the present time; and I feel no doubt that a solution will be arrived at. The processes of carbonization and gasification of solid fuel are receiving much attention. Experiments are proceeding with a view to obtaining the maximum yield of liquid fuel, as by chemical means the solid fuel can be split-up into its liquid, gaseous, and solid components. Experiments are also being made with the continuous vertical gas-retort, and in carbonizing at a low temperature.

The benzene and toluene in gas made for ordinary purposes was recovered for the manufacture of explosives during the war. Under the new Gas Act, it is no longer necessary to leave the benzene and toluene in gas. This provision has been made owing to the fact that so much gas consumed nowadays is used for heating purposes, and, of that employed for lighting, the great bulk is burnt in incandescent mantles. Whether or not those responsible for public gas supplies extract the benzene and toluene, is left to themselves. From the point of view of the public, it is better that they should, if thereby the price of gas to the consumer can be reduced. A gallon of benzole is commercially worth from 15d. to 18d. as a constituent of the gas. In pre-war days the unit of heat in petrol was worth two or three times that in town gas—the higher price being due to the special convenience attaching to a concentrated fuel of high volatility. The Act will ensure that no legal obstacle will prevent the removal from gas of the benzole it contains, if the manufacturer thinks it advisable or profitable.

During the war, coal gas was found very useful as a motor fuel; but the difficulty lies in the want of a suitable and economical container. The general, and right, tendency at the present time is to make the gas of a lower heating value per cubic foot than formerly; but this increases the difficulty of economical storage for motor-car purposes. If any of the new processes that are being tried are successful, they may produce a gas which is much richer than ordinary coal gas, and, therefore, more suitable for carriage in cylinders and in similar containers.

GAS-WORKERS' STRIKE AT TREDEGAR.

Tredegar, a mining town in Monmouthshire of 30,000 inhabitants, whose gas undertaking is owned by the local Council, was in an unenviable position last week, as it was without a gas supply.

The Council are guided, so far as the wages of the employees in all departments are concerned, by the awards of the various Industrial Councils for the region governing the different sections of labour; and these awards have been loyally abided by. This is only natural, as the Council is composed in the main of labour members nominated by the different trades union branches. The stokers at the gas-works have from time to time received awards; but for some period there has been resentment among them on the ground that, while employed in heavy, arduous labour of a responsible nature, they are receiving a rate of wage below that of semi-skilled and unskilled labour employed by the same Council. This culminated in the presentation of fourteen days' notice to terminate contracts. While the notices were running, the Gas Manager (Mr. D. W. Davies) and the Council endeavoured to arrange matters; but their hands were to an extent tied, as the wages agreements of the Industrial Councils are binding on both sides. A representative of the men's union came down and made every effort to persuade the men to withdraw their notices, but without avail; and last Saturday week the stokers ceased work. The reserve supply of gas was comparatively small; and at midnight on the Saturday the gas supply was cut off.

The Council found themselves faced with a serious position, and eventually decided to finish with the old stokers, who, by their own action, had terminated their positions as servants of the Council, and advertise for a new staff. The strike was entirely unauthorized, and against the advice of the Union leaders; and the Council felt themselves more than justified in taking this action. Up to the following Tuesday, one shift had been engaged on making gas; but it was hoped that in a short time three shifts would be at work. The Gas Manager told our representative that he hoped then to have the full service for the consumers. Mr. Davies has had an exceptionally busy time, as can easily be conjectured.

The trouble ended last Wednesday, when the supply of gas was resumed. When the Council took steps to re-staff the works, among the applicants, it is stated, were practically all the old stokers, who were re-engaged on the terms which existed when they left their work.

Quality and Price at Stafford.—Alderman Bedford, at last week's meeting of the Stafford Town Council, complained of the poor quality of the gas distributed from the works, and said that consumers were paying something like 200 p.ct. increase for an inferior article. Alderman Young (the Chairman of the Committee) said it was rather extraordinary to receive complaints of this kind, because the quality of the gas had considerably improved during the past fortnight, and was now at the old standard. Whereas the cost of material used at the gas-works had gone up 300 p.ct., the price of gas had only risen 70 p.ct. He maintained that the present price of gas at Stafford compared very favourably with that in any town in England.

THE IRON AND STEEL TRADES IN 1920.

The contrast between promise and performance has seldom been greater than was the case last year in the iron, steel, and allied trades. Twelve months ago the future was regarded with optimism, which was fully justified by the enormous expansion of the world's buying during the first six months of 1920. Since the beginning of the year, however, say Messrs. Bolling and Lowe, Ltd., in their annual report, there have had to be faced anxious and worrying times such as the trade has not experienced at any previous period of its history.

In Belgium, France, and more recently Germany, it seems competition to secure business has been so keen that wholesale reductions in prices for semi-finished and finished steel have resulted. In fact, during the last few months reductions of from £5 to £12 per ton have been made, according to the class of material. Though there are signs of a halt in some directions, in others, it is remarked, this cut-throat policy continues, and if prolonged for any considerable period will result in the survival of the fittest. The fact that the Continental demand has now practically ceased is attributed in part to the excessive prices demanded by a majority of the manufacturers in Great Britain, and also to the fact that, their works having been reconstructed, these countries are in a position to supply their own requirements, as well as to enter into competition for business abroad.

Glancing at a diary of the year, it is noted that in June steel billets arrived from Australia, and in July more Australian billets arrived, while Canadian mills were offering ship-plates at tempting prices. In August, increased railway rates seriously affected business, which became almost stagnant. Belgians were then offering joists, &c., and a month later were cutting prices. German competition also was increasing, and that country was offering wire and wire nails. British manufacturers were buying Belgian pig-iron in October. English prices were in November reduced in a few directions, and Continental prices were still falling. The year closed with business almost at a standstill, and buyers waiting until they knew to what extent prices of British material would be reduced. At any rate the first six or nine months of the current year, Messrs. Bolling and Lowe think, will be a period of fierce competition for every description of business, though, should prices be brought down to a satisfactory level and remain steady, renewed confidence would result, and the world's markets would respond. If financial conditions permitted, railway extensions, utility undertakings, and many branches of enterprise which have had to be suspended during the last few years, could be proceeded with.

At the middle of December, 1919, the price of hematite (East coast) pig-iron was £10 5s. per ton; and in 1920, £13 5s. per ton. In the same time, copper fell from £101 to £75 15s. per ton, tin from £235 to £212 10s. per ton, and lead from £41 10s. to £24 per ton. In December, 1919, steel joists were quoted at £19 15s., and in 1920 at £23 per ton; the figures for heavy steel rails being respectively £16 15s. and £22 per ton.

TRADE NOTES.

[For "Journal" Advertisers.]

A Large "Revergen" Enamelling Furnace.

The Davis Furnace Company have in course of erection, for a large firm in London, a 12 ft. by 4 ft. 6 in. by 1 ft. 6 in. "Revergen" gas-fired muffle-furnace, which is to be used for the enamelling process. This is said to be the largest gas-fired muffle enamelling furnace in existence. It is on the "Revergen" principle, and was ordered after the purchasers had made exhaustive investigations and tests at the Luton works of the Davis Furnace Company.

Applications of Aluminium to Gas.

A booklet issued by the British Aluminium Company, Ltd., of No. 109, Queen Victoria Street, E.C., illustrates a few of the more interesting uses of aluminium, and affords an indication of the extent to which this metal enters into modern industry. For one thing, sulphurous fumes have little or no effect upon aluminium, and this fact alone suggests many uses for it. Gas-lamp bodies, reflectors, &c., in aluminium are highly successful; and when corrugated it makes excellent roofing.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 14.

There is no alteration to report in the London Tar Products Market. In the absence of demand for products, prices are purely nominal; the last price quoted being creosote, 1s. to 1s. 1d. per gallon in bulk at makers' works.

There is a slight increase in the demand for sulphate of ammonia.

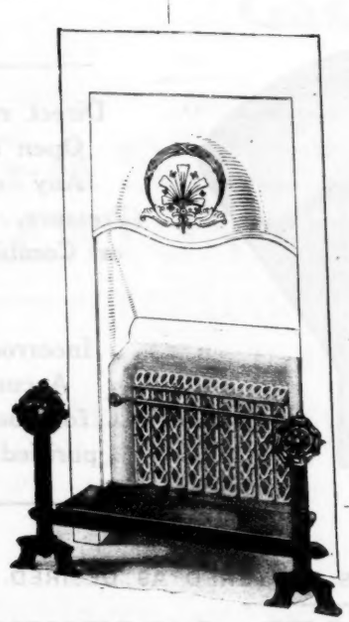
Tar Products in the Provinces.

Feb. 14.

There is little or no alteration in the markets for tar products this week. As regards pitch, we really cannot see that we could give a figure in view of the present state of the market. No business has been done now for some little time, and the value is purely a nominal one, which we write at 150s. at almost any port.

The average values for gas-works' products during the week were: Gas-works coal tar, 95s. to 105s. Pitch (see remarks above). Benzole 90 p.ct. North, 2s. 11d. to 3s.; crude 65 p.ct. at 120° C., 2s. 3d. to 2s. 5d. naked at makers' works; 50-90 p.ct. naked, North, 2s. 11d. to 3s. 1d. Toluol, naked, North, 3s. to 3s. 1½d. nominal. Coal tar crude naphtha in bulk, North, 1s. 1½d. to 1s. 3d. Solvent naphtha, naked, North, 2s. 10d. to 3s. Heavy naphtha, North, 3s. to 3s. 2d. Creosote, in bulk, North, liquid, 1s. to 1s. 0½d.; salty, 11½d. to 1s. Heavy oils, in bulk, North, 1s. to 1s. 1d. Carbolic acid, 60 p.ct.,

A Popular Coalition.



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1s. 10d. to 2s. Naphthalene, £25 to £30; salts, £8 10s. to £10, bags included. Anthracene, "A" quality, 1s. per minimum 40p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

The market for tar products, which is usually the last to be affected by bad trade, has remained depressed for several weeks past. Very little business has been done, and prices have been uncertain. At the moment it is satisfactory to note a more cheerful tone, with a slightly increased amount of business, although not sufficient to harden quotations. Export business is at a standstill; and it is rather amusing now to be informed that all restrictions on the export trade in tar products have been removed. Officialdom seems to wait until there is no export trade to be done, and then kindly informs those interested that they may do it! Pitch is still very dull, with only small transactions passing. The Continental demand has fallen away considerably. France is not buying at present, although she is expected to come in later. Belgium is reported to be making much greater quantities of pitch, and Germany is also supplying Belgian consumers with very low-priced material. South Wales consumers still maintain that they have plenty in hand for a long time ahead—some reports state up to the end of the year—and many fuel works are idle. Manufacturers, of course, are doing what they can; but it seems fairly evident that prices must come down further. Naphthalenes are idle; but the nominal prices are without change. The naphthas are flat, with practically no business to test quotations. Creosote is easier, and carbolic acid seems practically unsaleable. Makers declare that it no longer pays to extract. The same position is to be noted in cresylic acid. There has been a slight improvement in intermediate products, and some buyers are beginning to place orders for materials they require for early delivery. Aniline oil and salt are only in very quiet demand at last quoted rate, and salicylic acid remains featureless in buyers' favour. Resorcin has fallen away considerably, with no business to report.

The range of quotations is as follows:

Benzole: 90% London 3s. 10d., North 3s. 7d. to 3s. 9d.; 50-90% 3s. 3d. London, 3s. to 3s. 1d. North; crude 60-65%, 2s. 3d. to 2s. 5d.; pure, 3s. 3d. per gallon naked.

Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 112s. 6d.; North, 105s. to 107s. 6d. per ton *ex* works. Refined tar, 85s. per barrel (free) on rail.

Pitch: London, 175s. to 180s. per ton f.o.b.; East Coast, 165s. to 175s. per ton f.o.b.; West Coast, 162s. 6d. to 170s. f.a.s., with Manchester 200s. per ton, and Glasgow 195s. per ton; South Wales, 210s. per ton.

Solvent Naphtha: 90-160, 2s. 4d. per gallon.

Crude Naphtha: Naked, 11d. to 1s. 1d.; North, 1s. per gallon.

Heavy Naphtha: 2s. 8d. per gallon.

Naphthalene: Refined flake, £24 to £26 per ton nominal; inferior, £25; crude, £8 10s. to £14 per ton, according to quality.

Toluol: Naked, 3s. 4d. per gallon nominal; North, 3s. 2d.; pure, 4s.

Creosote: 1s. to 1s. 1d. per gallon; heavy oil, 10½d. per gallon in bulk.

Anthracene: 40-45%, 1s. 3d. to 1s. 4d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 5s. per ton f.o.r. makers' works.

Pyridine: 18s. to 22s. 6d. per gallon.

Aniline Oil: 1s. 7d. per lb., drums extra.

Aniline Salts: 1s. 9d. per lb.

Cresylic Acid: Crude, 2s. 6d.; dark 95-97%, 2s. 9d. to 3s.; pale 97-99%, 3s. 3d. to 3s. 6d., per gallon, drums free.

Carbolic Acid: Crude 60%, 2s. per gallon; crystals 40%, 8d. per lb. nominal.

Salicylic Acid: Technical, 1s. 4d.; B.P., 2s. per lb.

Xylol: Pure, 3s. 9d. to 4s. 3d.; commercial, 3s. 3d. to 3s. 9d. per gallon.

Resorcin: 7s. 6d. to 8s. 6d. per lb.; pure, 21s. per lb.

Alizarine 20%: 2s. per lb.

B. Naphthol: 3s. per lb.

Sulphate of Ammonia.

Business still remains quiet in this fertilizer; but that the demand will wake up later, and perhaps very suddenly so, seems a foregone conclusion. There is no doubt that farmers are operating for a further reduction in sulphate of ammonia prices as in the price of everything else they consume. The February price is £24 3s. 6d. per ton.

Across the Atlantic, there is reported to be a considerable contract trade being consummated with the domestic consumer. Nevertheless, the volume of business booked recently has had no effect on the general market position of sulphate of ammonia. Spot trading in America is inconsequential, with fair quantities of the product being offered in the resale market. As the result of keener competition among sellers, some attractive prices were quoted recently; but even they do not stimulate buying interest. Many of the large consumers are holding off, having a feeling that prices will be forced to lower levels as the result of a lack of buying.

On Wednesday evening, March 2, Mr. J. H. Thomas (late of the Ivory Coast, Congo, and Cameroons, and now of the South Metropolitan Gas Company) will give a limelight lantern lecture at the Borough Hall, Royal Hill, Greenwich, on "Central Africa: Before and During the War." The lecture is in aid of a very deserving cause—the Mayor's fund for the unemployed of Greenwich.

The London Municipal Society are starting a campaign to emphasize the problem of the rising tide of rates, and, where possible, to ease the burden. All who are willing to assist in this crusade for public economy are desired to communicate with the Rt. Hon. Lord George Hamilton, G.C.S.I., at the Central Offices of the Society, No. 1, Sanctuary Buildings, Great Smith Street, Westminster, S.W. 1.

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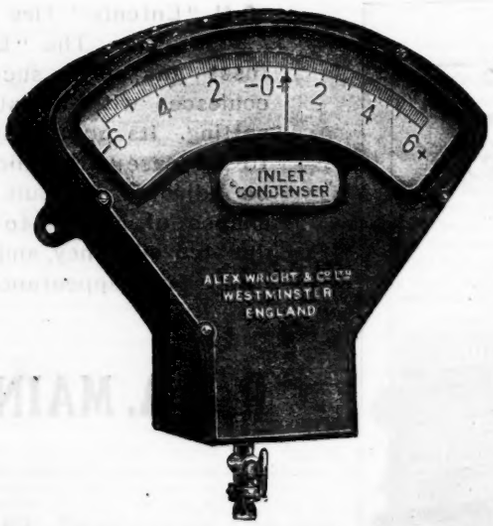

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Pipes for Yeovil.

At a meeting of the Yeovil Town Council, the acceptance was recommended of a tender of Mr. A. G. Cloake, of London, for the supply of 12-in., 6-in., and 4-in. pipes, amounting to £2852. The price was at the rate of £18 per ton. Alderman Petter asked what firm Mr. Cloake represented; and Alderman Matthews replied that they were French pipes supplied by a French firm. There were four English tenders for these pipes; and every one quoted to the penny exactly the same. The Committee were convinced that all four were in a combine. Mr Cloake was evidently outside, and quoted £5 2s. 6d. per ton less than the others for straight pipes, and £12 per ton for bends. Before recommending the acceptance of his tender, the Consulting Engineer and the Borough Surveyor went to the Tottenham Gas-Works to see some specimens, and found they had given every satisfaction. The Surveyor said the difference between the thickness of the French and English 6-in. and 12-in. pipes was $\frac{1}{16}$ in. This made a difference in the lengths per ton. They were also longer, and would be easier to lay, and there would be fewer joints to make. Alderman Petter thought they must adopt the recommendation, but suggested that, before the contract was definitely entered into, the Surveyor should make inquiry of the other firms to know if they would make a reduction in the contract. In any case, he should ask if the French firm were prepared to make a reduction, in view of the lower cost of iron. The resolution was carried.

Glasgow Coal Supplies.—The Gas Contracts Committee of the Corporation of Glasgow have instructed the General Manager of the Gas Department to purchase from week to week only such supplies of coal as may be necessary for the gas-works. This arrangement will continue throughout next month, and probably until June. The Committee will then consider the advisability of advertising for contracts or continuing the arrangement still further.

Rates and Gas Prices at Newcastle (Staffs.).—A recommendation of the Newcastle Gas-Works Management Committee, increasing the price of gas in respect of ordinary meters, including industrial and power consumers and the sewage works, 6d. per 1000 c.ft., came up for confirmation at a meeting of the Town Council last week. Alderman G. Scott (the Chairman of the Committee) said figures got out by the Manager of the gas-works showed that for the first nine months of the current year they had made a loss on the concern amounting to £1400. It was with the intention of recovering the position in the final three months that the increased price of gas was proposed. He reminded the Council that the Committee were paying off over £400 a year of an overdraft that had accumulated some years ago, and a further £200 a year of a capital overdraft. Also the ratepayers of the town were having a rate relief of 2d. in the pound, because the Gas Committee agreed that only £598 should be charged for street lighting. This was done in order to keep the rates as low as possible. The recommendation was agreed to.

Croydon Gas Company.

At the half-yearly meeting, next Friday, the Directors will report that, as compared with the corresponding period of 1919, the sale of gas shows an increase of 7·98 p.ct. In the half year the number of consumers has increased by 670. Under the powers of the Croydon Gas Company (Capital Issues) Consent, 1920, granted by the Board of Trade on Dec. 10, £115,000 of 7 p.ct. redeemable debenture stock was offered at 94 p.ct., and the whole amount was subscribed within a few days of opening the lists. The satisfactory results of the half year have been in large measure due to the very favourable prices obtained for residuals, which have offset the large increases of expenditure on coal and wages. The present trend of prices for residuals is downwards; while there are as yet no signs of a corresponding relief in the items of expense mentioned. It has accordingly been found necessary to increase the price of gas by 8d. per 1000 c.ft.; but it is hoped that circumstances may permit of a reduction being announced in the near future. Application has been made to the Board of Trade for an Order, under the Gas Regulation Act, to enable the Company to supply, from time to time, gas of such character as can be made and distributed most economically, and to so revise the Company's standard price and sliding-scale as to meet the increased cost of manufacture incurred since the war, and so relieve the stockholders from the reduction of dividend they have suffered. The decision of the Board of Trade is not yet announced; but it is anticipated it will not now be long delayed. After providing for all fixed charges, writing-down the investment in funding loan by £1150, writing-off £6000 in respect of the old works at Caterham, and carrying £3900 to the insurance fund, and £3000 to the renewal fund, there remains available for division a balance of £22,252. The Directors recommend that statutory dividends be declared for the half year at the following rates per cent. per annum (less income-tax): "A" stock, 10; "B" and "C" stocks, 7; "D" stock, 5; "E" stock, 7. These will amount to £18,299, leaving a balance of £3953 to be carried to the next account.

Gas Tests at Sheffield.—In their monthly report on Sheffield gas tests, the Gas Consumers' Association state that "the discrepancy between the Association tests and the Corporation tests is very marked. There has been a further increase in the proportion of non-combustible gases; and the calorific power has been lower than in any of the preceding 1920 reports."

Measurement, Ltd.—The registration is announced of a private Company bearing this title, to adopt an agreement with La Compagnie pour la Fabrication des Compteurs et Material d'Usines à Gaz and Messrs. Parkinson and W. & B. Cowan, Ltd., and to carry on in the British Empire or elsewhere the business of manufacturers of meters, &c. The capital is £100,000 in £1 shares. The first Directors nominated by the English Company are Sir Henry Cowan, M.P., Mr. F. R. Smith, and Mr. F. Thorp. The registered offices are at Fitzalan Street works, Kennington, S.E.

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Gas Offices, Market Hall, Leeds.
Jan. 28, 1921.

C. S. SHAPLEY,
Engineer & General Manager.

Wandsworth, Wimbledon, and Epsom District Gas Company.

The report to be submitted at the meeting next Tuesday states that the sale of gas during the past year exhibits an increase of nearly 7 p.ct. The revenue account for the year shows a profit of £65,638; and, after providing for the interest on debenture stock and mortgages, and on deposits and loans for the twelve months, and the payment of a dividend at the statutory rates for the six months ended June 30, there remains to the credit of the profit and loss (net revenue) account an amount of £26,323. The Directors therefore recommend that dividends for the six months ended Dec. 31 be declared at the statutory rates as follows: On the Wandsworth "A" stock, £4 15s.; Wandsworth "B" stock, £3 5s.; Wandsworth "C" stock, £3 6s. 6d.; Wimbledon stock, £2 12s. 6d.; Epsom stock, £3 5s.; and new ordinary stock, £3 6s. 6d. p.ct. per annum. The rebate of 10s. per ton received on coal used for domestic and household purposes was distributed to such gas consumers as were entitled to it. This is set forth separately in the accounts. The Directors are pleased to state that the price of gas has remained unaltered during the twelve months, though it was deemed prudent to give notice of an increase last June. The contemplated increase was, however, postponed. Under the Gas Regulation Act, 1920, an application has been made for alteration of the standard prices, in accordance with the provisions of that Act. The Directors report that the Act of Parliament promoted in the last session duly received the Royal Assent. A further Bill has been deposited; and the necessary special (Wharncliffe) meeting will follow the general meeting.

Bridge of Allan Gas Finances.—The Bridge of Allan Town Council have received a letter from the Under-Secretary for Scotland, urging them to increase the price of gas, and to levy an increased gas guarantee rate, so as to meet the full cost of the manufacture of gas and the annual contribution to the sinking fund. The Clerk was instructed to reply that it was anticipated that for the current year the price being charged, and the present gas guarantee rate, would be sufficient to meet the whole cost of production, as well as the sinking fund contribution.

Newport (Mon.) Gas Company.—The half-yearly meeting of the Company was presided over by Mr. George Geen, who said the passing of the Gas Regulation Act would mean, in their case, a dividend of 5 p.ct. per annum, instead of the miserably inadequate 3¾ p.ct., which is at present the maximum allowed. The accounts showed a further capital expenditure of £4748, the main portion of which was necessary in order to meet the demand for additional manufacturing and purifying plant. In comparison with the corresponding half of 1919, there was a satisfactory increase of £15,028 arising from the sale of gas, and £1050 from rental of meters and stoves; while owing to the greatly increased demand for coke and tar, some £9067 had been received for residual products. On the other side, manufacturing costs were up £15,698, and distribution £4535. The balance to profit and loss account was £10,808. A dividend of 3¾ p.ct. was declared.

Lurgan Gas Undertaking.—At a meeting of the Lurgan Urban District Council, the Gas Committee reported upon the necessity of having slot-meter money sent to the bank as soon as collected; and the Clerk said that at the end of the previous month they were about £3000 on the debit side on the gas-works, due principally to the fact that lodgment had not been made. Mr. Tallentine (the Gas Manager) said that, in view of a resolution of the Council, he did not feel justified in asking men to work overtime in relation to the collection. It was decided that the Gas Committee should deal with the matter.

An Effect of Wages Awards.—At the last meeting of the Accrington Gas Board, Mr. A. J. Harrison (General Manager) protested against the way in which some of the Wage Board awards are being applied. Before the war, Accrington paid wages higher than most towns in the district. When fresh awards were made, the increases were proportionately large, with the result that they had the unfair position of the local works being placed in one category, while other works were in a lower category. In a recent award, some of the men employed were receiving more than the award gave, yet no reduction could be made.

Nottingham Gas Employees' Agitation.—Dissatisfaction, which has found expression at several meetings, has long been rife among clerical workers engaged in the Gas Department of the Nottingham Corporation; it being suggested that there has been undue delay in carrying out the promised work of grading. Since the clerks and others became members of the National Union of General Workers, a policy partaking of a somewhat militant character has been adopted; and headed by Mr. Arthur Hayday, M.P., District Secretary of the national organization, there have been some interviews with the Committee, who have not evinced unwillingness to consider reasonable demands. But attempts are now apparently being made to force the situation; and the contemplated enlisting of the corporation of the general body of the Committee's employees is foreshadowed. Arrangements are being made for the holding of a mass meeting, at which the position is to be explained.

Brentford Gas Company.—The Directors will report at the annual meeting next Wednesday that the accounts for the past year show a profit on the revenue account of £73,127. After providing for the interim dividend to June 30, and fixed charges, there remains the sum of £11,698, which, with the balance brought forward, makes the amount of £61,130 available for dividends. The Directors having applied to the Board of Trade, and received their sanction to pay dividends under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, recommend the declaration of the following dividends, subject to income-tax: At the rate of 5 p.ct. per annum on the 5 p.ct. preference stock; at the rate of 3 p.ct. per annum on the "A" consolidated stock; and at the rate of £2 12s. 6d. p.ct. per annum on the "B" consolidated stock. The price of gas was raised on Oct. 1 to 5s. 4d. per 1000 c.ft. The increase of gas sold is 5·22 p.ct. over the previous year. The number of consumers is 124,093, as against 122,988 last year. The Directors have applied to the Board of Trade for an Order under section 1 of the Gas Regulation Act, 1920.

The "Standen"

THE
Davis Gas Stove Co., Ltd.
SALES DEPT. 60, Oxford Street, London, W. 1.

Dublin Lamplighters.—An Industrial Court have issued their award in an arbitration concerning the wages of lamplighters in Dublin. It had been complained that the lamplighters of the Alliance and Dublin Consumers' Gas Company, who were paid £3 12s. 3d. for a seven-day week, were receiving ordinary time for Sunday work. The decision was that the men were entitled to £3 6s. 3d. for a seven-day week, with the addition for Sunday of a five-hours day, calculated on the basis of a 47-hour week. The award is to take effect from the beginning of the present lighting season.

Storage at Accrington.—An inquiry was held by the Ministry of Health at Accrington, last Friday, regarding the application of the Gas Board to borrow £9380 for renewals to the large gasholder at the Great Harwood works. The Clerk said the total indebtedness was £330,490; and borrowing powers not yet exercised amounted to £91,580. A description of the holder was supplied, which showed that it is of the steel lattice guide-framing type, with triple lifts, having an available capacity of 900,000 c.ft. The guide-framing was stated to be in a dangerous condition, and required completely renewing. The new design is similar to that at Stafford.

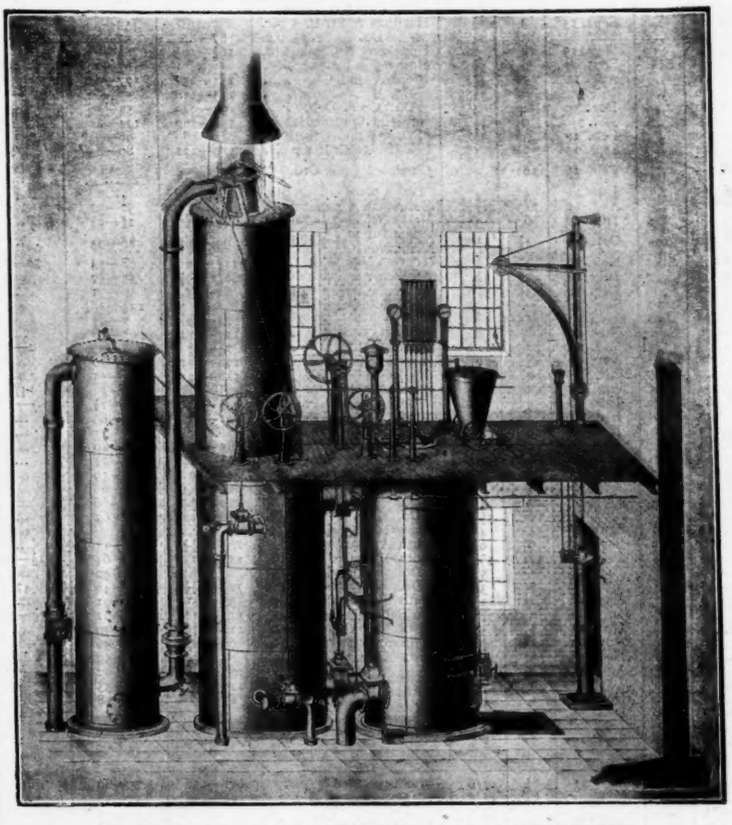
Report on the Swadlincote Gas-Works.—Following recent troubles in connection with the Swadlincote Urban District Council's gas supply, Mr. J. Ferguson Bell, of Derby, has submitted a report. He states he found the works generally in a poor condition. The thirty-two miles of mains are undermined by clay and colliery workings; and the consequent subsidences account for the high proportion of unaccounted-for gas, varying from 20 to 30 p.ct. The Council have decided to carry out a number of Mr. Bell's suggestions, in order to make the works more efficient. Our readers will observe the Council are advertising for a Manager to take the place of Mr. F. Robinson, who recently resigned.

City of Durham Gas Company.—The report adopted at the annual meeting of the Company stated that the profit and loss account showed an available balance of £3829, after deducting interim dividends of £2041. The Directors recommended a dividend for the half year ended Dec. 31 of 5 p.ct. on the original capital and 3½ p.ct. on the additional capital, less income-tax. Though there had been a gratifying increase in the quantity of gas sold, the income would have been much short of the expenditure had it not been for the exceptionally good yield from residuals. There had been a heavy fall in the price of coke for export since the miners' strike; and the cost of wages, coal, and stores generally was much higher than a year ago. The outlook for the coming year was none too bright. The Chairman (Mr. George Chapman) said they were able to carry on during the miners' strike; but it had been a great tax upon the Company. Taking everything into consideration, the year had turned out very well. The price of gas had reached the maximum—4s. per 1000 c.ft.—and they intended to apply to the Board of Trade for powers to increase the price. As compared with 1919, the revenue account showed an increased expenditure of £10,989, and increased receipts of £11,602; while the increase in gas was only £739.

Fleetwood Gas Company.—In the half-yearly report of the Company, the expenditure on capital account is given as £5088, including £4500 for water-gas plant, buildings, &c. The new plant recently installed is expected to effect considerable economies. The gross profit for the six months was £642, and the net £291. The latter, added to the balance of £1706 brought forward, makes a disposable balance of £1997. The Directors recommend a dividend at the maximum rate of £3 15s. p.ct. per annum. The gas sold last year was 74,907,000 c.ft.

Interference with Gas-Supply Pipes.—Mr. Thomas Dawson, Manager of the Carnforth Gas-Works, was the chief witness in a prosecution last Saturday, at Lancaster Castle, when the Company summoned John Douthwaite, a railway guard, for damaging a gas-pipe, and also for laying a pipe without consent. It was stated that when Mr. Dawson examined the defendant's premises, he asked if they had a gas-ring, and it was denied. Returning a few days later, Mr. Dawson and employees discovered that a connection had been made with the service-pipe before it reached the slot-meter; and a gas-ring with rubber tube and tap was secreted among some papers in a cupboard. Defendant said he only got the connecting-pipe at Christmas, and thought the gas went through the meter; but he admitted that the gas-ring had been in the house eight years. He knocked-up the pipe after the first visit of Mr. Dawson, thinking there was something wrong. The Chairman said it was a bad case, and defendant would have to pay the maximum fine of £5 in one case and 30s. in the other, or go to prison in default. He was lucky to get off so lightly.

Bournemouth Gas and Water Company.—At the annual meeting on Friday, the Directors will report that the continual rise in the price of coal, and cost of labour and materials, compelled the Directors to increase the price of gas from July 1 last by 3d. per 1000 c.ft. No increase has been permissible to the Company in their charge for water since the outbreak of war, though costs of pumping and distribution have advanced very largely. The Directors have deposited with the Ministry of Health a draft Provisional Order for the revision of water charges by an appropriate increase. Application will also shortly be made by the Company to the Board of Trade, under the Gas Regulation Act, 1920, for an addition to the standard price for gas in respect of the additional cost of manufacture and supply incurred by the Company since June 30, 1914. The working results of the past year have been very materially assisted by the sums realized for residuals; but a drop in prices since Dec. 31 has taken place. The sales of gas for 1920 exceeded those of 1919 by 10·58 p.ct. The Directors have paid interim dividends to June 30 at the rates of 6 p.ct. on the preference shares, 7 p.ct. on the "B" shares, and 5 p.ct. on the original shares; and they now recommend a further distribution at the following rates (all less income-tax): 6 p.ct. on the preference shares, 7 p.ct. on the "B" shares, and £4 12s. 6d. p.ct. on the original shares, for the second half of the year. All the dividends are at the full statutory rates. The balance to be carried forward will be £28,665. A resolution will be submitted to an extraordinary meeting, empowering the Directors to borrow a sum not exceeding £100,000.



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The Vertical Gas-Retort Syndicate, Ltd., report that a "Simplex" water-gas plant is at the present time in course of erection at the Elstree Gas-Works.

At the Accrington and District Gas Board meeting on the 10th inst., it was stated that for last quarter there was a reduction of 3,000,000 c.ft. in the gas sold, due chiefly to the fact that the mills—especially at Great Harwood—had been closed so long.

The Sowerby Bridge Gas Committee, it is understood, last week decided to recommend to the Council that work be found for unemployed men in the laying of a new gas-main to Warley Wood; the work to be under the supervision of the Gas Committee.

An open verdict was returned by the Leeds Coroner, last Wednesday, at an inquest on the body of J. H. Dalgliesh, who had been found dead in bed in lodgings, with the gas turned on full. There was nothing to suggest that he had committed suicide; and it was noticed that the gas-tap was very loose, and might have been turned-on accidentally after being shut.

At an inquest at St. Pancras it was stated that Isaac Cohen, jeweller, of Euston Road, was found dead in a room at the back of a lock-up shop, with the gas turned on. An Airedale dog, which usually slept in the passage, was lying under the bed, also dead. An open verdict was recorded.

At Leigh-on-Sea, last Friday morning, a woman named Weare and her three young children were found dead in their bedroom. From a burner downstairs was a length of flexible tubing 12 ft. long, which went through a hole in the ceiling and through the floor above into the bedroom, where the woman and the children were. The bedroom windows and also the door were closed.

An explosion in a tank lorry at the National Benzole Company's depôt at Fulham caused the death of the driver of a second lorry. The tanks were waiting to be filled; and an engineer was standing on the roof of the front wagon opening the manhole, when a spark got into the benzole. There was an explosion, which blew the back part of the tank out in the face of the driver of the lorry behind.

STOCK MARKET REPORT.

THERE was no improvement last week in the state of things on the Stock Exchange. Business fell away to an extreme degree. There was some pressure to sell, and the tone generally was dull.

The gilt-edged market was not very strong. Home Government issues moved irregularly. Victory showed weakness; and Bonds were easy. Friday's figures for the big four were: Consols 47¼-47⅞ex, War Loan 85½-85⅝, Funding 69⅞-70¼, Victory 76-76⅝. Home Rails continued weak, and Canadians also; but Argentines were steady. The Foreign Market did fairly well—French, Greek, Mexican, and Chinese being forward; but Russians were conspicuously out of favour.

The Miscellaneous Market was quiet, and for the most part dull; but Rubbers and Oils brightened-up a little before the close. Shipping, Textiles, and Iron and Steel were easier.

Business in the Gas Market was remarkably active; the general tone was firm, and some noteworthy advances were made. In the London Companies, Gaslight, *ex div.*, ordinary rose 3¼, maximum 2½, and preference 2. South Metropolitan, *ex div.*, rose 2½. Commercial, which has not yet held its general meeting, was unchanged. The transactions in Imperial Continental probably exceeded in number all previous records; and the quotation closed 2 higher. There was a reaction in Primitivas; and both share issues were quoted lower.

Bargains done for cash during the week were as follows: On Monday, Bournemouth "B" 8⅞, 9, British 22½, ditto debenture 54, Commercial 4 p.ct. 53½, ditto 3½ p.ct. 48, Continental Union 30, European 5⅜, 5⅝, Gas Light ordinary 53⅜, 54, 54½, 54⅝, 55, 55½, ditto maximum, 38½, 39½, 40, 41, Imperial Continental 124, 124½, 125, 125⅜, 126, 126¼, 126½, 127, 127⅛, 128, Ottoman 2 5/16, Primitiva preference 35s., 35s. 6d., 37s. 6d., South Metropolitan 61½, 62½, 62⅝, 63, South Suburban 58. On Tuesday, Aldershot 50, Brentford debenture 58, Bristol 63½, Gas Light ordinary 54½, 55½, 55⅝, 56, 56¼, ditto preference 58, Imperial Continental 127, 127¼, 127⅞, 128, 128¼, 128½, 128⅝, 128⅞, 129, 129½, 129⅞, Monte Video 70, Ottoman 2, 2⅛, 2¼, Primitiva preference 33s. 9d., 35s., South Metropolitan 62½, 64, Woking District 7 p.ct. "B" 40. On Wednesday, Aldershot 51, Bombay 4 1/16, Bournemouth "A" 8¼, Brentford "B" 49, 49½, British debenture 53, Commercial 4 p.ct. 54, Gas Light ordinary 55, 55⅛, 56⅛, 56⅜, ditto maximum 41, ditto 10 p.ct. bonds 132, Ilford "A" 77½, 78, ditto "B" 57⅜, 58, Imperial Continental 126, 126⅛, 127, 127⅛, 128, 128⅛, 128⅜, 129, Lea Bridge 75, Primitiva preference 33s. 6d., 35s., South Metropolitan 63½, 64, ditto debenture 47, South Suburban 57½, Barnet "D" 88, 88½, Eastbourne "A" 63½, 64, North Middlesex 4 p.ct. debenture 50. On Thursday, Aldershot 51, Gas Light ordinary 54⅛, 54⅜, 55, 55⅛, 55 7/16, 55⅜, 56⅛, ditto 10 p.ct. bonds 131, Imperial Continental 125, 125⅜, 126, 126⅛, 126¼, 126⅜, 127, Primitiva 14s. 6d., ditto preference 25s., 30s., South Metropolitan 62, British (Trowbridge) debenture 43½, Utah 5 p.ct. first mortgage 66⅛. On Friday, Brentford debenture 58, Cape Town debenture 58½, 59, European 5⅜, Gas Light ordinary 54½, 54⅝, 55, ditto preference 56½, 57, ditto debenture 48, Hastings and St. Leonards 3½ p.ct. 37½, 38, Imperial Continental 126, 127, Monte Video 70⅜, Primitiva preference 27s., 27s. 6d., 30s., South Metropolitan 62½, 62⅝, Tottenham "A" 58½, 59, ditto "B" 51½, 51⅝.

In the Money Market, there was a good, well-maintained demand, and discount rates hardened. The Bank rate is 7 p.ct., as fixed on April 17 last.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref. .	...	53—58	56—51
1,551,868	,,	Oct. 14	2½	3½%	Alliance & Dublin Ord.	59—64	38—43	...
374,000	,,	Jan. 13	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
420,000	5	Oct. 28	7½	8%	Bombay, Ltd. . . .	3½—6½	4—4½	4⅛
100,000	5	Aug. 12	10	5%	Bourne- { 5 p.c. . .	...	8—9	8¼
383,110	10	,,	7	7%	mouth Gas { B 7 p.c. .	13—13½	8½—9	8⅝—9
115,000	10	,,	6	6%	and Water { Pref. 6 p.c.	13½—14	7½—8½	...
162,065	—	Dec. 30	—	4%	{ 4 p.c. Deb.	...	55—60	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid. .	261—266	50—55	...
734,920	,,	,,	11	26/3	Do. B New . . .	204—209	47—52	49—49½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	68—73	...
221,400	,,	Dec. 15	4	4%	Do. 4 p.c. Deb. .	91—93	57—59	58
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig. .	208—213	100—110	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	75—85	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max. . .	...	...	63½
530,000	20	Sept. 15	12½	10%	British	44—45	21—23	22½
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	50—55	53—54
243,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	37—40	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1½—2½	7—7½	...
100,000	10	Dec. 10	—	4½%	Do. 4½ p.c. Pref. .	4—6	5—6	...
100,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	55—60	58½—59
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	53—56	53½—54
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	48
475,000	,,	Dec. 15	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	42—45	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	25—30	30
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	30—40	...
31,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c. . .	...	123—135	...
278,400	,,	,,	11½	7½%	Croydon B and C 7 p.c.	...	96—100	...
492,270	Stk.	—	6	5%	Derby Con. Stk. . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17½—18	5½—6½	5½—5⅝
16,298,975	Stk.	Feb. 10	4/17/4	30/-	Gas { 4 p.c. Ord. . .	98—102	54—57*	53⅝—56½
2,600,000	,,	,,	3½	26/3	Light { 3½ p.c. max. .	76—79	38—41*	38½—41
4,062,235	,,	,,	4	4%	and { 4 p.c. Con. Pref.	96—99	55—58*	56½—58
4,674,850	,,	Dec. 15	3	3%	Coke { 3 p.c. Con. Deb.	72½—74½	45—48	48
130,000	,,	Dec. 11	10	10%	{ 10 p.c. Bonds. .	...	...	131—132
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 p.c.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	37½—38
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16½	8¼—9¼	...
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c. . . .	...	87—89	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C . . .	151—154	77—81	77½—78
65,780	,,	,,	6½	3½%	Do. B	115—118	57—62	57½—58
65,500	,,	Dec. 30	4	4%	Do. 4 p.c. Deb. . .	92—94	54—56	...
4,940,000	,,	,,	9	4½%	Imperial Continental .	150—160	124—129	124—129½
1,235,000	,,	Feb. 10	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	90—95*	...
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c. .	119—121	80—85	75
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A.	211—213	...	...
					{ B.	146—148	...	...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	3½%	Maidstone 5 p.c. . . .	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4½—4¾	1¾—2¼	...
250,000	100	Oct. 1	4½	4½%	Met. of { 4½ p.c. Deb.	99—101	86—93	...
541,920	Stk.	Nov. 26	4	6%	Melbourne {			
1,875,892	,,	July 29	4½	3½%†	Monte Video, Ltd. . .	11½—12	68—73	70—70½
529,705	,,	Dec. 30	3½	3½%	Newcastle & Gatsh'dCon.	98½—99½	55—57	...
15,000	10	Sept. 15	—	8%	Do. 3½ p.c. Deb.	82—83	50—51	...
55,940	10	,,	7/14/0	58%	North Middlesex 10 p.c.	...	12½—13½	...
300,000	Stk.	Nov. 26	8	8%	,, ,, 7 p.c.	14—15	7—7½	...
60,000	5	Mar. 26	10	1/-	Oriental, Ltd. . . .	117—122	93—98	...
60,000	50	Aug. 27	13	7½%	Ottoman, Ltd. . . .	7½—7¾	2—3	2—2 1/16
100,000	50	,,	12	6½%	Portsea Island, B . .	128—131	65—70	...
249,980	5	April 29	8	—	Do. C . .	118—121	50—55	...
499,960	5	June 26	5	—	Primitiva Ord. . . .	5½—6	1—1½	14/6
521,800	100	Dec. 1	4	4%	Do. 5 p.c. Pref. .	4½—5	1½—1¾	25/—37/6
600,000	Stk.	Jan. 27	4	4%	Do. 4 p.c. Deb. .	91—93	67—69	...
346,198	,,	Dec. 30	4	4%	Do. ,, ,, 1911	...	39—41	...
150,000	10	Sept. 30	6	6/-	River Plate 4 p.c. Deb.	85—87	37—40	...
125,000	50	Jan. 3	5	5%	San Paulo { 6 p.c. Pref.	10½—11	6½—7½	...
135,000	Stk.	Aug. 27	10	5%	{ 5 p.c. Deb.	47—49	37—39	...
209,984	,,	,,	10	4%	Sheffield A	223—224	63—66	...
523,500	,,	,,	10	3½%	Do. B	222—224	63—66	...
133,201	Stk.	Sept. 15	4	4%	Do. C	220—222	60—62	...
90,000	10	Sept. 30	9	9%	Shrewsbury 5 p.c. . .	...	...	...
6,609,895	Stk.	Feb. 10	5/4/0	5%†	South African . . .	10½—11½	10½—11½	...
250,000	,,	Jan. 13	—	5%	South Met. Ord. . .	111—113	61—64*	61½—64
1,895,445	,,	,,	3	3%	Do. Red. Pref. .	...	90—92	...
224,820	,,	Aug. 27	8½	3%	Do. 3 p.c. Deb..	72½—74½	45—48	47
1,087,795	,,	July 29	6	3½%	South Shields Con. Stk.	157—159	89—91	...
247,558	,,	Dec. 30	5	5%	S'th Suburb'n Ord. 5 p.c.	114—116	56—61	57½—58
647,740	,,	Nov. 12	7½	3½%	Do. 5 p.c. Deb. Stk.	116—118	65—70	...
121,875	,,	Dec. 30	4	4%	Southampton Ord. . .	99—102	55—58	...
120,000	,,	Aug. 12	—	3½%	Do. 4 p.c. Deb. Stk.	...	57—59	...
782,275	,,	,,	6	2½%	Tottenham { A 5 p.c. ..	133—138	57—62	58½—59
181,255	,,	Dec. 15	4	4%	District { B 3½ p.c. .	115—117	50—55	51½—51½
182,380	10	Dec. 30	5	—	{ 4 p.c. Deb.	87—89	53—58	...
149,900	10	July 1	5	5%	Tuscan, Ltd. . . .	5—6	1—2	...
236,476	Stk.	Sept. 15	5	3½%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
					Tynemouth 5 p.c. max.	108½—109	69—71	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 27	8½	47/6	Wandsworth A 5 p.c.	151—156	75—80	...
255,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	53—58	...
108,075	,,	,,	—	33/3	Do. C . . .	...	50—55	...
140,865	,,	,,	—	33/3	New Ordinary . . .	...	50—55	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c. . .	117—122	43—48	...
98,000	,,	,,	6½	32/6	Epsom 5 p.c. . . .	121—126	50—55	...
88,416	,,	Dec. 30	3	3%	3 p.c. Deb. Stk. . .	66—69	43—45	...

* Ex Div. † Next dividend will be at this rate.

GAS JOURNAL & COAL WASHER. SOLE MAKERS OF THE CONTINUOUS